MAR. 21 1958

PETROLEUM WEEK

A McGRAW-HILL PUBLICATION

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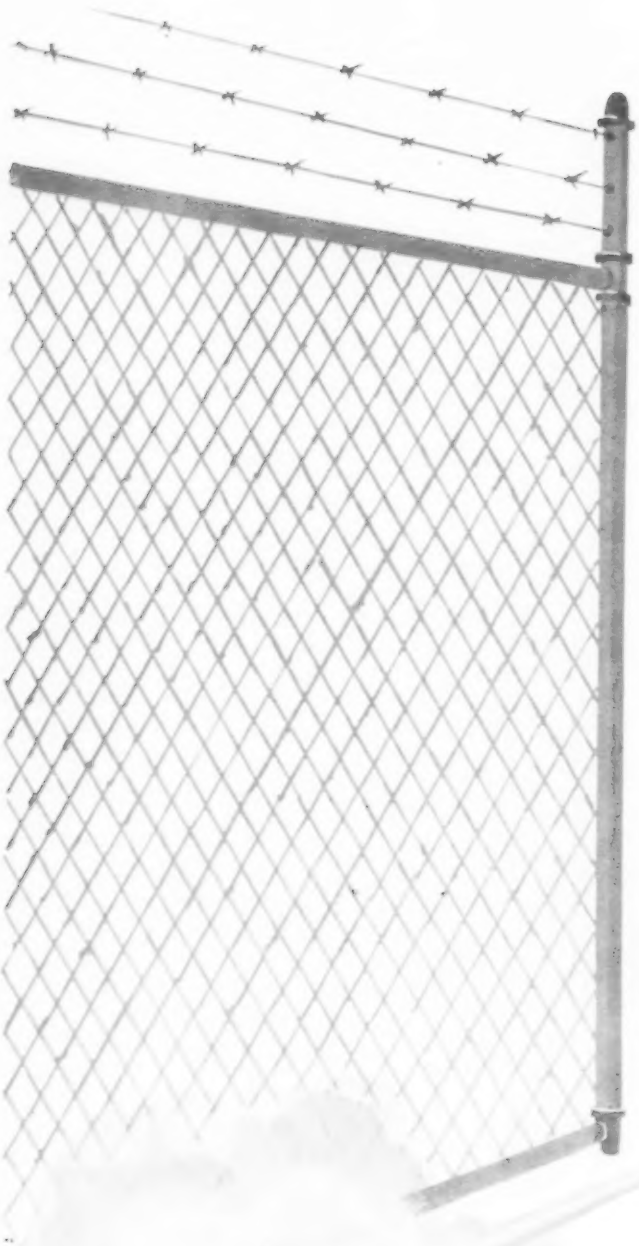

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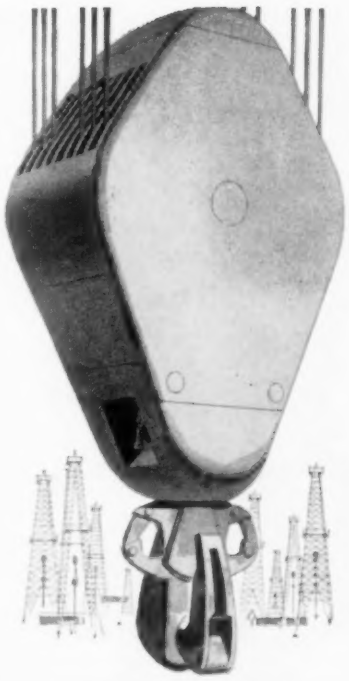

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Good Wells Make Good News

A Monthly Report Of Successful Well Treatments

March 21, 1958

For sustained production increases from many formations, fracturing is often recommended over any other stimulating technique. "Frac" sand provides a permanent propping action in formation fractures — to improve the drainage characteristics of the well. Here are some recent examples of what has been achieved with Dowell fracturing services.

- **Reagan County, West Texas.** (Old well) Production from this Spraberry well had declined to 15 bopd. Dowell recommended fracturing with Petrojel* to increase production. Treatment was performed using 60,000 gallons jelled crude and 90,000 pounds sand. Because the well was producing from three sets of perforations — 6583 to 6607, 7436 to 7460 and 7486 to 7492 — 275 ball sealers were used during treatment. Injection rate averaged 53 bpm at 1600 psi. *Well tested 100 bopd 33 days after treatment.*

- **Beaver County, Oklahoma.** (New gas well) This well was completed through perforations in the Hoover formation (4450 to 4484 feet). Duofrac* was recommended as the best fracturing service to bring in this well. Dowell fractured using 30,000 gallons three per cent acid carrying 1 pound sand per gallon. In this case a surface tension reducing agent and FLA* (Fluid Loss Additive) were also used. Injection rate averaged 55 bpm down casing. *Production increased from a show to 40 mmcfd.*

- **Hamilton County, Illinois.** (New well) Petrojel was used to fracture this well drilled in the Aux Vases. Casing was set and perforated from 3118 to 3148 feet, four shots per foot. Dowell fractured with 15,000 gallons jelled crude and 15,000 pounds sand at an average injection rate of 31 bpm. 35 ball sealers were injected midway through the treatment. *Well flowed 2030 barrels of oil during the first 20 hours it was opened, and levelled off at 1437 bopd after it cleaned up.*

- **San Juan County, New Mexico.** (New well) Completed in Mancos sand through perforations, 1130 to 1182 feet and 1222 to 1285 feet, this well tested 20 boph. Because of thick pay section, operator wanted to fracture and retest. Dowell recommended Sandfrac*, using 65,000 gallons lease crude and 65,000 pounds sand. Injection down 5½-inch casing averaged 76 bpm. 150 ball sealers were injected behind first 30,000 gallons fluid to divert remaining fluid into less permeable zones. After treatment, *well flowed 120 boph on a prolonged test.*

Dowell offers nine basic fracturing services and an infinite variety of modifications to meet the specific requirements of any well. For more information or service, call any of the 165 Dowell offices in the United States and Canada; in Venezuela, contact United Oilwell Service, or write Dowell Incorporated, Tulsa 1, Oklahoma.

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60-Second Summary / WHAT'S HAPPENING IN OIL

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March 21, 1958

dept/INDEX

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Oil's outlook for the rest of 1958 may be bright, even if demand shows no gain. Inventories have been lowered substantially. A tight rein on new supply for three more months could wipe out product surpluses, strengthen prices. . . . p. 9

•

The government has its top brass wrestling with the oil imports problem, if that's any consolation to you. But, thus far, the State Dept. has failed to "rescue" the voluntary plan, and a Cabinet committee can't make up its mind. . . . p. 11

•

Imaginative interpretation of well data can help find overlooked oil. That's the theory of C. C. Winn, a San Antonio (Tex.) independent operator. And he's putting it to the test again on farmouts in Southwest Texas. . . . p. 25

•

The potential for a new field in northern Kuwait looks big. Kuwait Oil Co. plans to get production started in its Raudhatain field next year, and an aggressive drilling program is expected to boost output to 200,000 b/d within two years. . . . p. 55

•

U.S. petrochemical exporters can expect competition from Japan. The petrochemical industry there is an infant, but it shows signs of growing up fast. . . . p. 38

•

The payoffs at Lake Maracaibo are high—but so are the costs. Don't consider getting into the gamble at the Venezuelan lake unless you have a stack of blue chips. . . . p. 52

•

The TBA business is still there—if you go get it. A survey shows that potential per-car sales have climbed from $169.69 in 1957 to $187.91 this year. A big share of this increase is in accessories—up from $41.30 to $51.39 per car. . . . p. 48

•

A new research project could lead to the recovery of billions of barrels of crude. A Texas physicist is heading a study of possible uses of radioactive waste to create molecular changes in tar crudes so they can be recovered. . . . p. 10

•

Britain is a busy oil center, despite practically no crude production (only four rigs are working). Brisk demand for products keeps refining, marketing, and transportation outlooks bright. . . . p. 12

•

A marginal operation in New Mexico may soon be economically attractive. An experimental miscible-phase displacement project appears so successful in increasing production it may be tried on the entire Bisti field. . . . p. 18

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Up to the Minute / SIGNIFICANT LATE NEWS

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March 21, 1958

Three of the five largest U. S. oil companies found 1957 a year of record profits, despite a business downturn. Standard of California had a 7.6% gain in net. This week Texaco reported a 9.9% hike and Gulf one of 25.4%. Excluding a nonrecurring profit, Gulf's net was up 14%. On the other hand, Jersey Standard's estimated net was down 1% and Socony's profits were off 12%, due partly to a change to the "LIFO" inventory system. Profits of the strictly domestic companies are ranging from slight increases to sizeable declines.

•

Rotary drilling in the U. S. and Western Canada dropped to an eight-year low this week. Only 1,903 rigs were running. The slowdown has been developing all year, with operations declining in every week of 1958 except two.

•

A small refiner is demanding that crude pricing be changed to reflect actual refining values of various oils. Ingram Oil & Refining Co.'s F. B. Ingram won't renew present purchase contracts for domestic crude "unless they are written on a price basis more closely related to the value of products" (PW—Mar.7'58,p12). Ingram recently cut prices 40¢ a bbl. for spot crude.

•

Commissioner Olin Culberson predicts that Texas oil wells generally will produce only 140 days this year, compared with 171 days of flow in 1957.

•

Red China claims it has made the biggest oil strikes in China's oil history. Three "gushers," two of them reported as "spectacular," were said to have blown in on consecutive days last week on separate structures in a triangular 8,492-sq. mi. area between Buch Gakchi and Nanju, 100 mi. from Chungking.

•

The Federal Power Commission wants to whittle down the backlog of gas cases. To do so, it told a House group this week, it needs $3.2-million—a hike of $675,500 over its current budget. It hopes, in two years, to reduce the carryover cases to about 25% of the total filed in any one year.

•

The military apparently isn't changing its policy on offshore oil purchases—at least not right away. The Military Petroleum Supply Agency this week called for bids by Apr. 2 on almost 100-million gal. of jet and referee fuels to be delivered to military bases in the U. S. And nothing was said about restricting Caribbean or other offshore bidders.

•

Don't believe the rumor that steel prices aren't going to go up this summer when higher wage costs take effect under steel labor contracts. The price hike will be made, even though steel sales are slow now.

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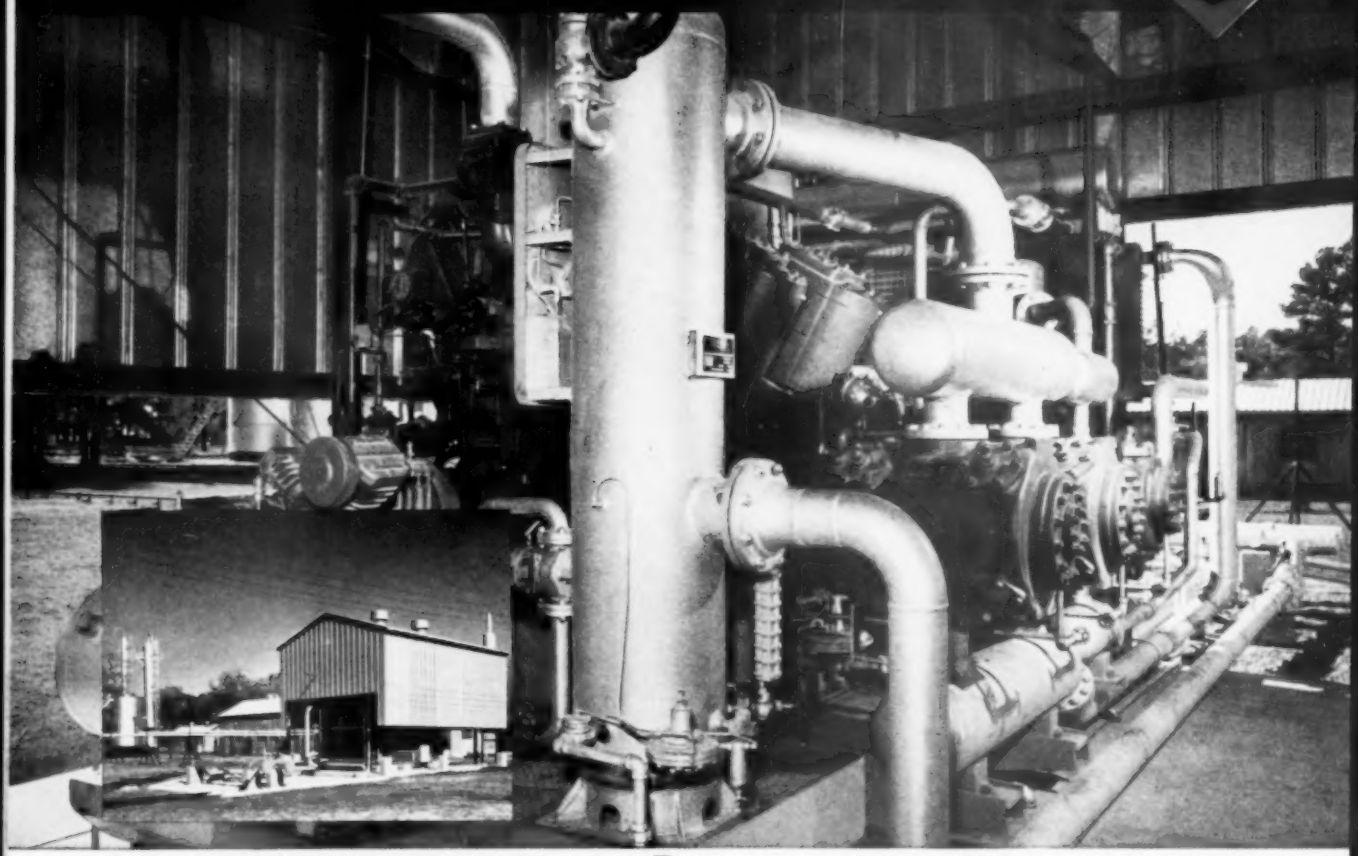

H. M. Harrell Recycling Plant booster station -- equipped with a Beaird - Ingersoll - Rand 6SVG 330 h.p. four cycle gas engine driven packaged compressor plant. Young radiator with lubrication oil cooler and gas coolers, and all necessary controls for unattended operation. Other sizes 120 to 660 h.p.

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PETROLEUM WEEK
March 21, 1958

The Next Quarter Could Be Bright...

IF new supply were held to . . .	AND IF Total demand in April-June averaged . . .	THEN total stocks would fall by . . .	AND June 30 inventories would total . . .	
8,700,000 b/d (the March rate)	8,783,000 b/d (unchanged from 1957)	7.5 million bbl.	730.0-million bbl.	
8,789,000 b/d (up 1% over March)	8,871,000 b/d (up 1%)	7.6-million bbl.	729.9-million bbl.	
8,874,000 b/d (up 2% over March)	8,959,000 b/d (up 2%)	7.7-million bbl.	729.8-million bbl.	
8,700,000 b/d (the March rate)	8,871,000 b/d (up 1%)	15.5-million bbl.	722.0-million bbl.	Low enough so that crude production could be increased.
8,700,000 b/d (the March rate)	8,959,000 b/d (up 2%)	23.6-million bbl.	714.0-million bbl.	

But there is no chance for an increase in crude output until heavy inventories are worked off.

The oil industry, after tightening its belt in the first three months of the year, now faces a brighter outlook—even if demand in the remainder of 1958 shows no gain over 1957.

Indications for the first quarter of the year are that both total demand and supply are nearing a much more favorable position than had been expected.

It now appears that total demand—domestic and export—in the January-through-March period will average 10,222,000 b/d, and possibly slightly higher if the weather during the remainder of March is cold.

The indicated first-quarter demand is nearly 200,000 b/d higher than had been anticipated at the start of the year, and only 3.7% below the record quarterly demand set in the first three months of 1957, when exports were unusually large.

But the big feature of the first quarter is the indicated reduction in the rate of new supply—domestic output plus imports.

It now appears that the total new supply for the first three months of the year won't exceed 9,060,000 b/d, or about 400,000 b/d less than had been estimated earlier.

Because of such rates of demand and supply, stocks are declining substantially. The indicated reduction in total inventories of crude and products in the first three months will average more than 1.1 million b/d, considerably greater than the 720,000 b/d reduction in the first quarter of 1957.

This means that, by Mar. 31, total inventories may run only about 737-million bbl., or within 50-million bbl. of what many industry experts say is a proper level.

But even with the sharp reduction, total inventories still are high—which means that:

The industry still isn't in a position to loosen its belt on new supply. But if the rate of new supply could be held to the March level of about 8.7-million b/d, the surplus inventory problem would be corrected by June 30.

In fact, at such a continued tight new supply rate for three more months, the industry could be in a very strong economic position by the end of June.

For, as the table above shows, the estimates of the industry's possible inventory position by the end of the second quarter are based on little or no increase in demand.

If total demand in the second quarter should approximate the level of last year, it means that total new supply will have to be held in the March rate if total stocks are to be reduced to within a range that oil economists say is desirable.

Most of them say that unless June 30 stocks of crude and products fall below 735-million bbl., the inventory position will continue to be heavy, keeping prices under pressure.

Even if demand for the next quarter should show a gain of 2% or more over the 1957 second quarter, there is no need for an increase in the rate of new supply before the end of June.

At the current inventory level, there's little risk of reducing stocks too much.

But to hold the rate of new supply to 8.7-million b/d in the second quarter will be difficult. It really depends upon a reduction in imports—which haven't been cut so far.

U.S. production, which in March is at its lowest level since November, 1954, is considered to be at a low for the year—even though some states, notably Illinois, New Mexico, Oklahoma, and Wyoming, are still pro-

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ducing more than they did last June.

And even if allowables are not increased in the other prorated states, new production will gradually push the total U.S. output upward.

In the first two months of the year, total imports averaged a little more than 1.5-million b/d, up 9.7% over a year earlier.

Some estimates, made at the start of the year, show second quarter imports at 100,000 b/d less than in the first quarter.

But since those estimates were made, the import situation has changed considerably. In view of the threat of tighter controls—which, even if they're realized, probably won't become effective until after June 30—imports could run above the estimated level during the second quarter.

New supply could be increased slightly in the second quarter. But there would have to be a corresponding increase in demand if the further needed reduction in stocks is to be made.

As the table (page 9) shows, a 1% gain in demand over the second quarter of 1957 would result in a reduction in stocks to approximately 730-million bbl.—provided total new supply rises no more than 1% over the March level.

But a 1% gain in demand may prove impossible. At least, there are no current estimates that total demand in the second quarter will rise even that much.

Because of the sharply lower level of exports this year, domestic demand will have to increase by about 5% in the second quarter if total demand is to hold even with last year's second quarter.

Any expansion in domestic demand in the second quarter would depend primarily on gasoline, since the demand for fuel oils in that period represents principally buying to replenish inventories.

And despite the large drafts on distillate fuel stocks in recent weeks, there are no indications of additional buying to replace stocks.

Gasoline demand in the second quarter of last year fell below expectations, due to heavy rains over the Midwest and floods in the Southwest, which hurt farm demand and early vacation travel.

In addition, government buying of gasoline was declining in the second quarter.

If the weather during the second quarter of 1958 is normal, it would probably mean a gain in gasoline demand this year.

But with new automobile sales lagging, and consumers generally showing signs of spending less, some oil economists are more reluctant than ever before to predict a big upturn in spring gasoline demand.

The most optimistic of recent estimates shows a second quarter domestic gasoline demand of about 3.5% over last year.

Even if domestic gasoline demand expands in the second quarter, the gasoline stock level indicates no need for an increase in refinery runs over the current reduced rates.

If demand should gain as much as 3.5%, refinery runs just slightly higher than current levels—or up to no more than 7.6-million b/d—would mean that stocks of gasoline by June 30 would be reduced only to about the 191-million bbl. level of last June 30.

With runs averaging 7.5-million b/d (approximately the current level), and with gasoline yields of about 45% on crude charge (about the current ratio), gasoline stocks by June 30 could be trimmed 10-million bbl. below last year, assuming a demand gain of 3.5%.

Oil Hunt with Gamma Rays

Another 'futuristic' project is under way: An effort to use radioactive wastes to tap billions of barrels of hitherto unrecoverable crude.

The feasibility of using radioactive waste to boost crude recovery in "sealed" reservoirs is being investigated by a University of Texas physicist, Dr. George W. Crawford.

The research project, using radioactive cobalt, is under way in laboratories at the university. It is being sponsored by the Texas Petroleum Research Committee.

A year will be spent in laboratory study of the reaction of crude oil to radiation. After that, Crawford and his associates hope to be ready for actual field testing.

The ultimate aim is to unlock billions of barrels of tar-type crudes, which are now unrecoverable.

The potential is staggering. For instance, it has been estimated that a single field in Texas has an estimated 4-billion to 5-billion bbl. of crude in place—but only a few thousand barrels have been produced over a 20-year span.

The viscosity in that field, Crawford says, is about 1,000 times higher than that of the usual crude.

Heavy radiation of petroleum increases viscosity, military research has shown. But Crawford believes that light doses of radiation may reduce it.

Unlike other secondary recovery methods, which use heat or pressure to boost flow, radioactivity would change the molecular structure of the crude.

The aim in inducing this molecular change would be to produce a lighter oil, which could be brought up from the reservoir.

Crawford hopes to prove that gamma rays, with their penetrating qualities, will reach into areas that current secondary recovery methods can't touch.

He expects to show that gamma rays—the same high-energy type as X-rays—will be absorbed by the heavy molecules of crude. Because of the penetrating ability of gamma rays, he believes that the most dense material can be penetrated to great depths.

The research will seek laboratory determination of how long it takes reaction to occur, and how long it will require for the waste to become safe underground.

"At present," Crawford says, "there is insufficient information available in the literature or in the unclassified files of the Atomic Energy Commission to determine the effect.

Eventually, problems of transportation and storage will have to be solved. Crawford considers transporting of the waste to an oil field for injection a "separate problem." But safe storage for the waste is a second major goal of the current project.

Obviously, there are many other unanswered questions facing the experimenters. Crawford lists these two:

- Will irradiation produce a change in a given crude which will help increase recovery?
- Can the irradiation products be controlled so that the result is beneficial? That is, can the molecular breakup and recombination be regulated to achieve a desired result?

Crawford points out that carefully chosen reservoirs will be needed for the field research.

For one thing, the owners would have to agree to allow "sealing" of the reservoir for an indefinite period—perhaps for years—while the radioactive waste works its change in the molecular structure underground.

Too, production from the reservoir, after irradiation, would have to wait until all danger from radiation is passed.

Finally, Crawford says, the reservoirs must be selected carefully to guard against leakage of radioactive material into fresh-water sands or other exposed areas.

"We can't have radioactive material wandering about underground," he points out.

Irradiation may also prove successful for work outside the "sealed" reservoirs. Crawford lists these possibilities:

- The abandoned "gas drive" field, where large quantities of crude are often left. Irradiation may change this into a produceable crude.
- Other abandoned reservoirs, with much channeling and tight pore space. Irradiation may effect changes that will permit production in later years.

State Dept. Strikes Out

State Dept. efforts to come up with a solution to the oil imports problem apparently have fizzled.

Last week, State Dept. officials rushed a mission to Venezuela in an effort to "sell" the Venezuelans on some form of regulated cutbacks in their crude production.

The U.S. representatives talked for five days with top Venezuelan oil officials about a possible Western Hemisphere approach to the problem (PW—Mar.14'58,p6). But they didn't have much luck.

One main purpose of the visit was to point out that the U.S. restrictions resulted from—and were not the cause of—the current supply-demand situation.

That is, the U.S. spokesmen pointed out, the major reasons for the imbalance in oil supply and demand are development of new sources and the general economic recession.

They urged the Venezuelans to help prevent letting either production or imports reach a level that would "discourage maintenance of a healthy economy in oil-producing nations of the Western Hemisphere."

The Venezuelans said in reply that they recognize that the international economic situation has influenced the world market. But, they said, they feel that the U.S. should consider "obligations of different countries in regard to economic, social, and political situations in each."

In other words, it seems that now is a rather touchy time to be asking Venezuelans to cut their production further. Clearly, they will oppose any new restrictive measures.

The failure thus far of the State Dept. efforts further endangers continuation of the "voluntary" plan to imports controls.

The State Dept. had moved into the picture in an effort to stave off mandatory controls by the President.

The department feels strongly that mandatory controls would have many repercussions abroad—and that Venezuela and Canada would be particularly offended.

Therefore, they have been urging that working agreements be made on a voluntary basis.

The Administration is quite willing to accept such an approach—if there is reason to believe it will work.

This week, the knotty problem was right back in the lap of the Cabinet oil committee, headed by Commerce Secretary Sinclair Weeks.

The committee held a meeting before midweek, but committee members came out of it shaking their heads. Another meeting will be held soon, perhaps late this week or early next week in an attempt to reach some conclusion.

The Commerce Dept. has hinted that it has some moves in mind that would strengthen the voluntary program.

There is speculation that Commerce officials believe further pressure can be put on violators, and that established importers can be persuaded to make some room for new importers.

Meanwhile, the House Ways & Means Committee still plans to push its study of possible congressional action.

It will hold further hearings next week. And unless there is prior action by the Administration, the group quite likely will recommend an imports restriction law. However, many congressmen are still hopeful that a satisfactory "voluntary" plan could be devised by the Administration.

Oil Man's Album

No Atom Tanker Will Ever Match This Beauty

In this day of 100,000-ton tankers and 20-knot speeds, the "Falls of Clyde" would be out of place—unfortunately. This graceful four-master bark was only 266 ft. long, with a hull of iron and a gross tonnage of 1,809 tons. It carried 19,000 bbl. of oil. The ship was built in Scotland in 1878 and was converted to a bulk oil carrier in 1904. A year later, the ship was purchased by Associated Oil Co., now a part of Tidewater Oil Co. It was used on a Pacific run to Honolulu for many years, before being retired and sold in 1920.

(No. 6 in a Petroleum Week series)

MARKETERS include many U.S. companies, led by Jersey Standard's Esso.

REFINERIES are expanding at a fast clip, boosting capacity toward the 1-million b/d mark by 1965. This night view shows water cooling towers at the left.

Bustling Oil Industry Keeps Great B

Major role in global oil operations is sparked by thriving domestic demand, increasing refining capacity, and continuing foreign oil activity. British companies produce about a third of all oil entering international trade.

Booming refining capacity, growing domestic demand, and increasing foreign oil activity are keeping Great Britain in its key role in the world-wide oil industry.

The country is a leading consumer of oil products. With little domestic production of its own, it is a heavy importer of crude. And its crude needs are increasing with the growing number of new and expanded refineries throughout the country. Some of their products are exported.

Because of the activities of both its oil and its shipping companies, it has a big interest in oil operations around the world.

Among free world countries, Britain follows only the U.S. and Canada in total oil consumption.

British companies produce more than a third of all oil entering international trade from a score of different countries, according to the Petroleum Information Bureau. Including Royal Dutch Shell, this averages around 2.4-million b/d.

British Petroleum and Royal Dutch Shell have slightly more than a 50% share in Iranian production, a 30% share of all oil produced elsewhere in the Middle East and in the Caribbean area, and about two-thirds of Far East production.

London is the largest headquarters in the world outside New York for international oil operations. It is headquarters for the internationally owned groups operating in the Middle East as well as the world-wide activities of Shell Petroleum and British Petroleum. Such American companies as Gulf, Jersey Standard, Caltex, and Socony all have British subsidiaries.

The outlook for companies operating in Great Britain—including U.S. firms—is bright: They are faced with the happy problem of a long-range rise in demand, now expected to double to 1-million b/d by 1970.

Total energy demand is expected to increase at the rate of 2% a year, but the oil demand increase will be much faster. Coal, prime source of energy in the U.K., cannot keep pace with rising demand, and responsibility for filling the gap between total energy demand and supply is falling increasing on the shoulders of the oil industry.

Although there is considerable speculation on how the nuclear power station program will affect petroleum consumption after the late 1960s, most oil men agree that rising energy demand will leave plenty of room for oil.

Oil demand has shot up 91% since 1948 to today's 500,000 b/d level. Due largely to Suez crisis rationing, consumption fell about 5% last year. But it rose 8.5% in 1956. And this rise is expected to resume this year—at a lesser rate, however, due in part to government lids on public and private capital expenditure.

The demand jump is spurred by increasing industralization, population boosts, and the conversion of power stations to oil. The steel industry is also expected to become a big user of fuel oil. The petrochemical industry and gas industry are expected to need more and more oil for their operations.

Refineries are mushrooming, boosting capacity at a faster rate than in the U.S. It has increased 13 times over in the past decade, to 639,000 b/d.

With this expansion has come a new British industry, petrochemicals. Britain's petrochemical industry today

COME RAIN OR SHINE. Britain is preparing its harbors for an age when supertankers will dominate international oil traffic. Britain has the world's largest tanker fleet, totaling over 9.2-million tons. Almost all of Britain's crude is imported.

Britain in Key World Oil Role

leads in Europe, with an annual output of 265,000 tons.

Refinery capacity may reach about 1-million b/d by 1961 if all plans now proposed are completed.

About 218,000 b/d of capacity will be added to existing plants by Esso, Shell, and British Petroleum. Esso is also planning a 100,000 b/d plant for Milford Haven, and, if Caltex decides on a proposed refinery at Southampton Water, capacity will be boosted still another 100,000 b/d.

Increasing amounts of crude imports will be needed to feed the expanding capacity.

Imports of crude totaled about 580,700 b/d in 1956, dropping slightly to about 567,800 b/d in 1957.

In both years, just over 50% of Britain's crude came from the British-protected Persian Gulf Sheikhdom of Kuwait, where oil production is owned jointly by British Petroleum and Gulf.

One reason imports run so high is that domestic production is so low—about 1,700 b/d in 1957. The total number of rigs now operating in the U.K. is four.

Imports of refined products are expected to slack off as the refinery expansion takes effect. In 1957, product imports totaled about 224,200 b/d, compared with 195,500 b/d in 1956.

The oil industry in the U.K., following the rest of Europe, is undergoing a complex shift in product demand, with greatly increased consumption of fuel oil.

Residual fuel oil already accounts for about 45% of refinery throughput in the U.K., and gasoline and aviation fuels about 25%. Proportions in the U.S. are roughly 17% for residual fuel oil, and 45% for gasoline and aviation fuel.

By 1965, the consumption picture is expected to look like this: fuel oils, 50.6%; gasolines, 20%; gas/diesel oils, 18.3%; kerosine, 6.4%; other products, 4.7%.

Britain, an island nation with the world's largest tanker fleet, is also busy preparing its harbors for the age of the supertanker.

A deep-water terminal, is under construction at Milford Haven, Wales, which will accommodate 100,000-tonners (PW—Sep.6'57,p46). Shell is planning two large floating stages at Transmere on Merseyside, each capable of taking 65,000-ton tankers. In fact, virtually every port that handles tankers is slated for enlargement.

How do U.S. companies fit into the oil picture? You can get an idea by driving down any road in Britain: Chances are almost 50-50 that the first service station you come to sells gasoline or lubes supplied by an American-owned company.

Although BP and Shell reportedly sell more than half the products consumed in Britain (they market jointly), U.S. companies have a substantial share of the market.

Standard Oil Co. (N. J.) is the largest, commanding an estimated 25% to 30% of the market, selling products in about 21.3% of Britain's 32,500 retail outlets.

Also in the picture are Caltex (Regent Oil), Socony Mobil, and Gulf.

Sales of British-made oil equipment have doubled since 1951. The equipment industry has burgeoned along with the refineries. It also has developed an increasing export business. Total output has spurted by 6% to 10% a year since the end of World War II.

More than $374-million worth of equipment was sold to companies with offices in Britain last year—second highest figures on record.

Some U.S. firms have set up manufacturing subsidiaries in Britain to share in the thriving sterling-area market. Dresser Industries, Hughes Tool, Cameron Iron Works, and Mission Mfg. all have subsidiaries.

British equipment in most cases has the same specifications as that produced in the U.S. Some of it—especially drilling equipment—is manufactured under license from American firms.

(This is the second of a PETROLEUM WEEK *series comparing oil developments in other nations with those in the U.S. The next story will be on France.)*

What's New / IN THE INDUSTRY

Oklahoma Sweet Crudes Cut 15c by 3 Buyers

A significant downward adjustment hit Oklahoma sweet crudes this week with three buyers reducing their postings by 15¢ a bbl., affecting about 73,000 b/d in the northeastern and central parts of the state.

The adjustment was at least indicated about a month ago when Kerr-McGee Oil Industries, Inc., imposed a 15¢-a-bbl. pipeline charge on sweet crude it buys in northeastern Oklahoma (PW—Feb.21'58,p19).

Effective last Monday, Kerr-McGee, which buys about 48,000 b/d in the area, substituted a 15¢ cut in posted prices for the gathering charge.

The change was made, the company said, since the deduction "created operating, royalty, and tax problems for some producers, a number of whom have suggested that we substitute a reduction in posted market price in this area for the 15¢ deduction."

Kerr-McGee's new postings reduced sweet crude of 40-gravity and above to $3 a bbl.

The reduction was followed by Midland Cooperative, Inc., which buys about 5,000 b/d from leases in Lincoln, Payne, Logan, and Noble counties, an area slightly west of the region affected by the Kerr-McGee cut.

And effective today (Mar. 21), Champlin Oil & Refining Co. is reducing its postings in central Oklahoma by 15¢ a bbl. About 20,000 b/d are involved.

•

A top atomic official suggests that oil associations work together in mapping possible projects to test the A-bomb as an oil-recovery tool.

The official, Gerald W. Johnson, told PETROLEUM WEEK that several oil firms are already showing interest in such experiments.

The possibilities for oil include nuclear shots to heat depleted fields, break up oil shales, and heat tar sands in place (PW—Mar.7'58,p14).

Johnson is working on the government's project at the University of California to study nonmilitary applications of nuclear detonations. He said the government is eager to cooperate with the industry in making these experiments.

He suggested that interested oil men get a copy of "The Underground Nuclear Detonation of Sept. 19, 1957, Ranier Operation." It can be bought for $1 from the Office of Technical Services, Dept. of Commerce, Washington 25, D. C.

•

The controversial "Memphis" decision on gas pipeline rates is figuring in another case on which the Federal Power Commission will have to rule.

This week a $4-million rate-hike request by Michigan-Wisconsin Pipe Line Co. was turned down by FPC Examiner William J. Costello. He based his action entirely on the Memphis ruling.

In denying the increase, he said that, although it might be "just and reasonable," the decision of the appeals court in the Memphis case required that he reject it, since the company had not received the approval of its customers for the increase.

FPC has appealed the ruling to the U.S. Supreme Court, but it won't come up for a hearing until fall.

•

Douglas Oil Co. of California and San Jacinto Petroleum Corp. have signed a long-term crude-supply and profit-sharing agreement on products sold by Douglas on the West Coast.

San Jacinto will supply a "substantial portion" of Douglas's crude requirements. The first year's volume is expected to amount to 2-million bbl., subject to import restrictions.

It is expected that the first shipments will come from Venezuela. San Jacinto also has production on the Gulf Coast, in the Four Corners area and in the Middle East.

Douglas will refine the crude in its three West Coast refineries, and the products will be sold under a profit sharing agreement.

San Jacinto is providing Douglas immediately with a ten-year loan of $11¼-million for additional storage facilities, pipeline tie-in, and working capital.

•

New Mexico's crude allowable for April will be slightly above March, due to an increase in the northwestern part of the state in anticipation of the start-up of the Four Corners line to California.

The Oil Conservation Commission set the northwest allowable at 20,685 b/d, based on a 35 b/d unit allowable, up 25 b/d from March.

The allowable in the southeast was set at 271,970 b/d, based on a 33 b/d unit, down 2 b/d from March.

Including 11,000 b/d in supplemental allowables, the total will average 303,655 b/d, up 905 b/d.

•

American Petrofina, Inc., has acquired a third company with the completion of its purchase of Petro-Atlas Corp. and its subsidiary of El Dorado Refining Co.

The latest acquisition is said to involve a consideration of less than $25-million, to be paid principally in company securities.

Involved are about 3,000 b/d of crude production, a 20,000 b/d refinery, and marketing facilities serving about 500 retail outlets.

•

If the present Canadian Government is returned to power in the Mar. 31 federal elections, it will press for the use of western Canadian crude in Montreal should U.S. outlets prove inadequate.

That was a campaign promise of Prime Minister John Diefenbaker this week. He said the Canadian Government still hopes that the U.S. can be convinced that Canadian crude should retain its present outlets in the U.S.

But discussing an alternative Montreal market, he said such an outlet for western Canadian crude "will be given high priority" if his government is re-elected.

Diefenbaker also promised that his government would give "unhesitating" approval to export of surplus Canadian gas provided the Borden Commission's interim report "justifies this action."

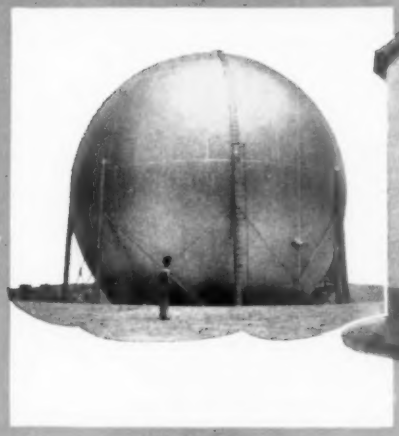
NEXT WEEK in Petroleum Week

Plenty of new, important equipment is on the way to help pipeliners do a better job in building and running the nation's pipelines. Next week, a Petroleum Week Special Report will focus on such pipeline equipment developments—with special emphasis on new pipelaying equipment and remote-control systems for pump stations.

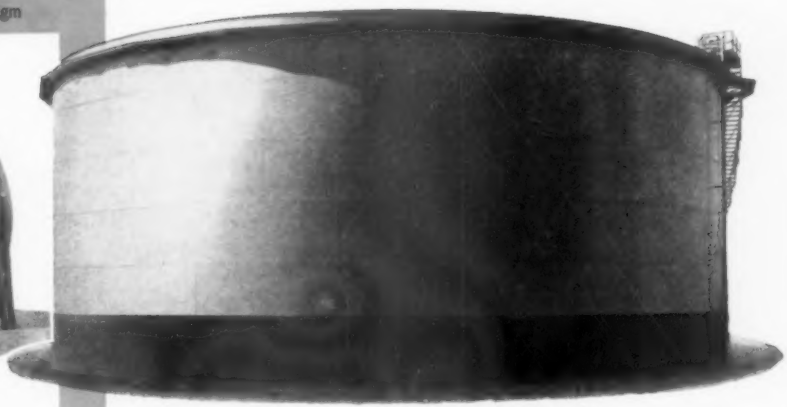
HAMMOND

STORAGE TANKS and PLATE FABRICATION

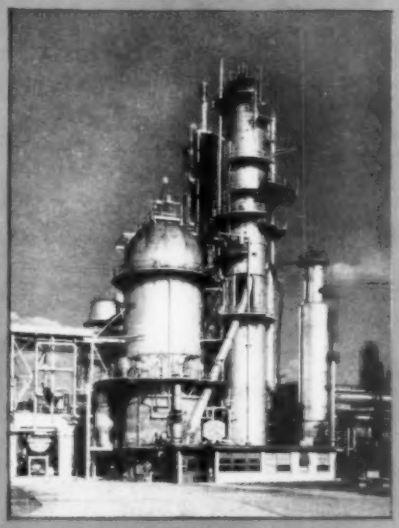
DIALIFT* tank with vapor-saver diaphragm



Hammond Sphere

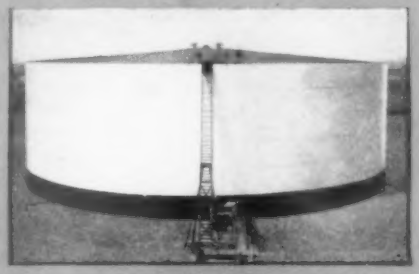


Hammond TUBESEAL* and SPRINGTITE* Floating Roof Tanks



Process Vessels—Steel • Stainless • Alloys • Cladmetals

Water Storage Tanks



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Looking Ahead in Washington

McGraw-Hill
Washington
Bureau
March 21, 1958

A new move for natural gas legislation may divide producers. Sen. Russell Long (D., La.) has revived the old idea of limiting federal regulation to big producers—those who sell more than 2-billion cu. ft. of gas in interstate commerce annually. Previously the bill had been backed only by consumer-state lawmakers. Now Long and Sen. Ralph Yarborough (D., Tex.) are pushing the plan, and it takes on new meaning.

The bill will tempt more small producers than before. It would have easy going in Congress if most producers backed it. Consumer opposition would be nil. Note that Sens. Joseph Clark (D., Pa.) and Estes Kefauver (D., Tenn.)—two foes of earlier gas bills—are cosponsors of the Long measure. But already there are signs that many producers aren't ready to throw in the towel and accept the new bill. Sen. Mike Monroney (D., Okla.) has lost no time in making known his opposition.

•

Conflict-of-interest arguments are dying out in Congress. The Democratic-controlled houses used to give Eisenhower appointees a rough going-over because of stock holdings. But now the Senate has finally approved the appointment of Dr. Paul D. Foote, a former Gulf Oil Corp. official, to be Assistant Secretary of Defense for Research & Development. Foote refused to sell his oil stocks, and the Senate refused to pass on him. Now, after a year, the opposition has capitulated.

•

The petroleum industry will boost spending on new plants and equipment. Although heavy stocks are threatening the market, the industry will spend $50-million more for refinery and allied expansion during the second half of 1958 than is planned for the first six months, according to government surveys. So, while many businessmen are cutting their spending, petroleum is one of the few bright spots in this area.

•

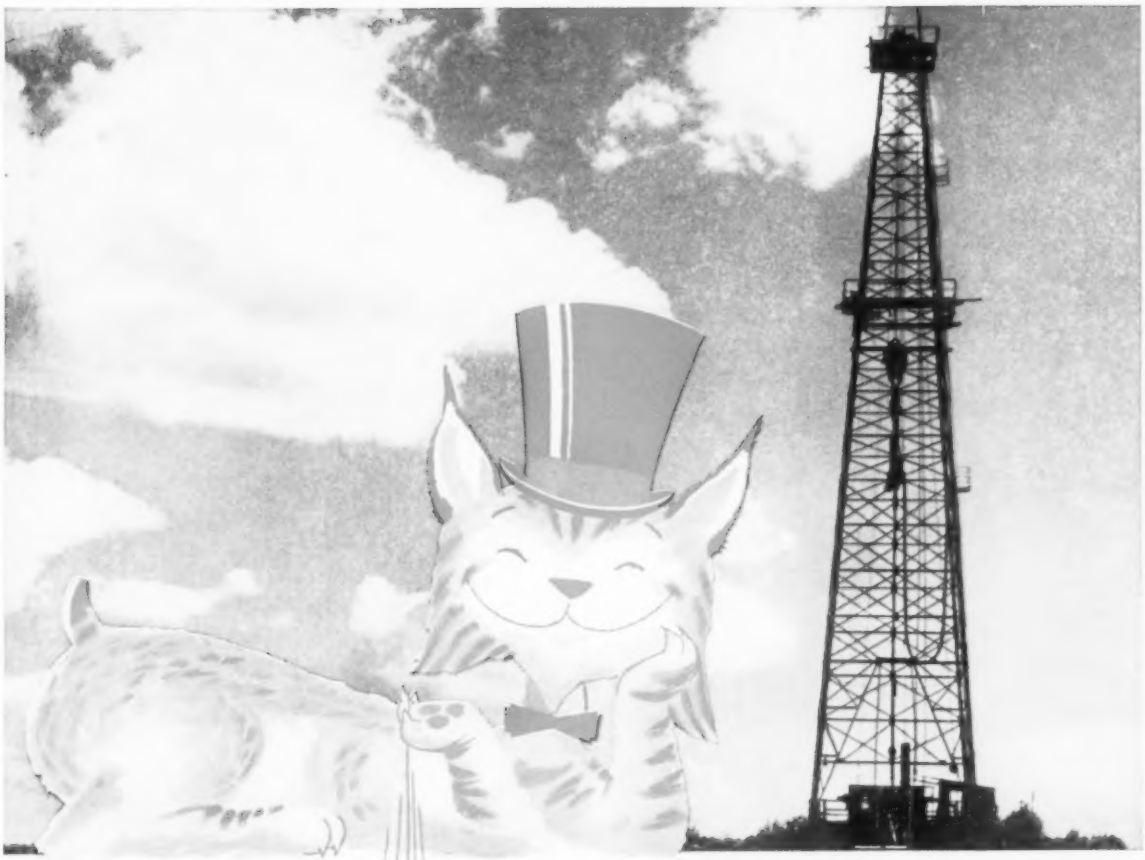
The federal grand jury in Alexandria, Va., must act by mid-year or a new jury will have to take over the oil investigation. The term of the current jury, which heard more testimony on marketing and prices this week, expires June 30. Justice Dept. attorneys—still angling for indictments—indicate they won't drop the investigation if the present jurors fail to act, even though familiarizing a new jury with the evidence would be tedious.

•

A two-chairman plan is being considered for the National Petroleum Council. The Justice Dept. is still opposed to an industry man heading the advisory group. But the latest proposal—cochairmen representing both the industry and the government—might be a compromise which both sides could support.

•

Rep. Wright Patman (D., Tex.) may use a new forum for his oil pricing ideas. Patman is chairman of Congress' Joint Economic Committee, which will hold hearings in May on the relationship of prices to economic stability. So far, the plans call for a general hearing, but Patman may try to drum up support for his antitrust bill, H.R. 11.



"Wildcats" *are thriving in Canada!*

Canadian drilling activity in 1957 was highlighted by five rich wildcat oil strikes in the Virginia Hills section of Alberta and continued success in Pembina. Drilling was also very active in southeastern Saskatchewan which is currently regarded as the "hottest" oil area in Western Canada.

One of the brightest aspects of Canadian oil opportunity to U. S. oilmen is the remarkable success ratio of wildcats to wells brought in—one producing well for each three to four wildcats.

U. S. Oilmen Like To Do Business With the B of M

Over 250 offices of the Bank of Montreal give U. S. and Canadian oilmen day-to-day service in the oil-rich provinces where most of Canada's new drilling activity is now concentrated. The Bank will gladly give you detailed information on any phase of Canadian oil.

"A Guide for Oil and Gas Operators," 40-page brochure published by the B of M, is a basic reference for facts on the ownership and disposition of petroleum rights in the oil provinces. A copy is yours for the asking. Contact John A. Baines, Manager, Oil & Gas Dept., Bank of Montreal, 140 Eighth Avenue West, Calgary, Alberta, Canada. (Telephone AMherst 6-8701).

No Stock Recommendations

While the Bank is prepared to provide all available information on the oil industry, it does not make recommendations regarding the purchase of individual oil stocks.

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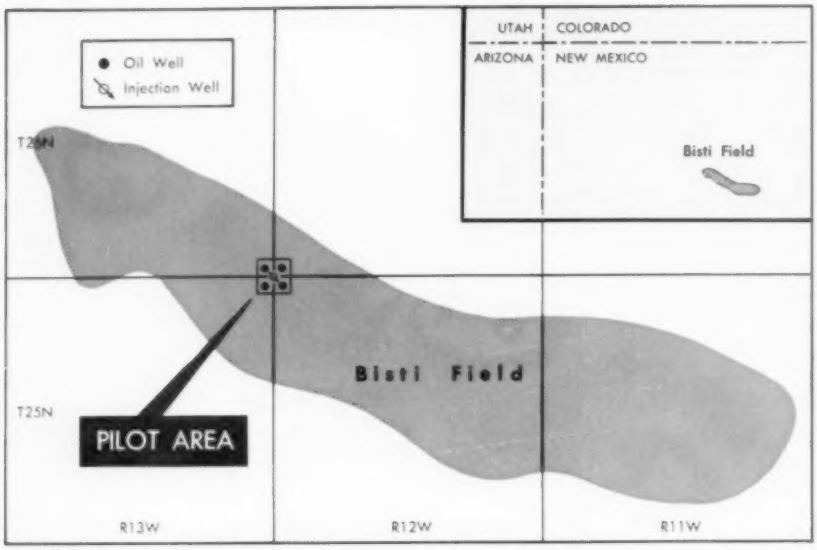

PILOT PROJECT: Robert Brooks, Sunray engineer, adjusts a valve on an injection wellhead. After six months of operation, this . . .

Miscible Flood Gives Bisti a Boost

An experimental miscible-phase displacement project in the Bisti field, San Juan County, N. M., is changing the field from a marginal operation to one that is economically attractive.

After six months of operation, the pilot project is showing signs of success, according to Sunray Mid-Continent Oil Co., operator of the project. The test area embraces 160 acres of the Lower Gallup formation in the field, combining wells on four 40-acre tracts under a cooperative agreement.

Engineers say several factors indicate that the pilot project will be successful—to the point that miscible-phase displacement may be attempted over the whole Bisti field. Among the factors:

- **A pressure increase was noted shortly after the turn of the year.** At that time, the pilot project had been in operation only four months. Increases in pressure were noted not only on the four producing wells in the 160-acre test area, but on wells as far as 1 mi. from the injection well.
- **The increase in gas-oil ratios has been slowed since the first of the year.**

The wells still have a gas-oil ratio of less than 2,000-to-1. If the miscible-phase displacement program had not been started, engineers feel, the ratio would have continued to skyrocket as it had in the preceding months.

- **The producing rate has increased.**

The four test wells have produced 88,000 bbl. of oil since the start of the project in September. This compares with a total cumulative production from these same wells of only 17,000 bbl. before the pilot project began. And two years were required to produce this amount.

Engineers say that higher flow rates over longer periods have resulted because of the project. Without the LPG flood, the normal rate of decline would have seen a sharp drop in output instead of the increase that has been registered.

Bisti is only a bit over two years old. The Lower Gallup sand reservoir was discovered in December, 1955, when El Paso Natural Gas Products Co. completed No. 1 Kelly State for 646 b/d of oil. Drilling on adjoining leases began early in 1956, and development progressed rapidly. As of Dec. 1, 1957, 187 wells had been completed in the field.

Cumulative production to Dec. 1, 1957, was 1,162,000 bbl. Allowables for the field were established last December by the conservation commission, which also adopted a one-year temporary order establishing 80-acre proration units. The field is some 24 mi. long by 1½ mi. wide.

Operators hope to recover a little more than twice the amount of oil through miscible phase displacement than would have been recovered under normal operations.

Sunray, British-American Oil Producing Co., and Phillips Petroleum Co. are cooperating in the pilot project.

"We feel that we have changed the status of the Bisti field with this pilot project," says one engineer.

Very early in the life of the field, operators recognized that the field was going to be a problem, and that the percentage of recovery under primary operations would be low.

Under Sunray's leadership, an engineering committee was formed to study the problems, collect well-test data, and keep records on all types of reservoir behavior, knowing that these data would be needed to plan a program leading to maximum production from the field.

A total of 31,000 bbl. of butane and propane, and 85-million cu. ft. of dry gas, have been injected into the project area.

The injection well is in the center of a 5-spot pattern.

Of the 31,000 bbl. of LPG, 7,600 bbl. of butane was injected first. This was done in order to obtain better miscibility at the butane-oil front. The butane was followed by 17,000 bbl. of a tailored LPG mixture, composed of 50% butane and 50% propane. The tail end consisted of 6,400 bbl. of propane. Butane and propane were used because both products were readily available.

LPG was injected at the rate of

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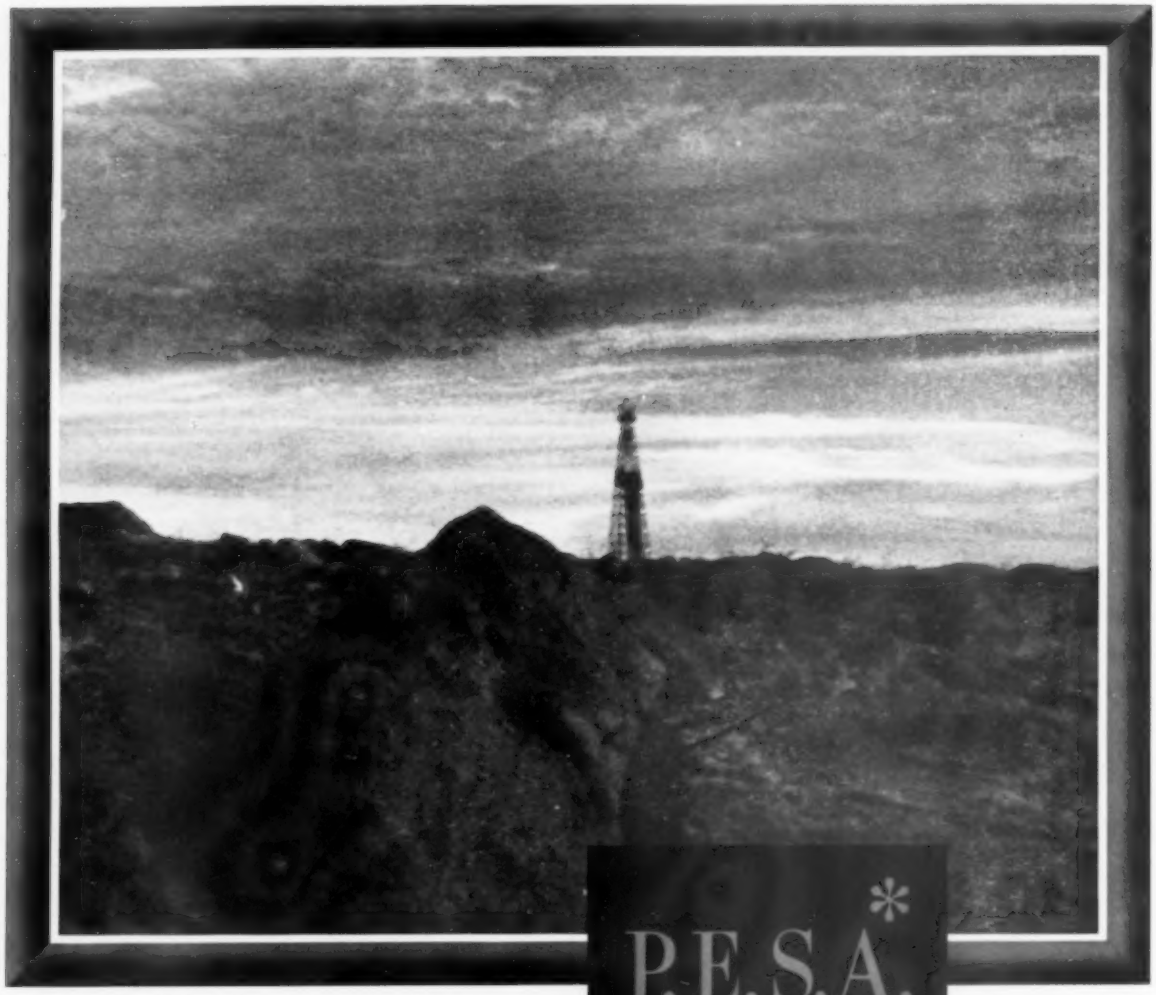
Where In The World Will They Find Oil Next?



"And some rin up hill and down dale, knapping the chucky stanes to pieces wi' hammers, like sae many road makers run daft. They say it is to see how the warld was made."

Sir Walter Scott
St. Ronan's Well—1824

We have evidence of geologists at work in 1824. It was inevitable that the "rock breakers" would one day develop sciences that would be useful in the search for oil. Present day methods, however, would not be recognized by early day proponents of the art. And much credit must be given those who spent their lives in geological interpretation.

The practice of formation and surface feature study was followed by the torsion balance, the gravimeter, refraction and reflection seismic techniques. The first geophysical prospect (torsion balance) to be proved in the United States was on the Nash Ranch in Fort Bend County, Texas. A year later, the first seismic discovery was made at Orchard, Texas.

Since that time, geophysical crews have traveled the length and breadth of the world in the search for indications of gas and oil.

And wherever oil has been found, PESA Supply, Service and Manufacturing members have made their contributions to the development of oil fields throughout the world.

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B7—104

PROUD TO BE PART OF A PIONEERING INDUSTRY

1,000 b/d, and gas at the rate of approximately 500,000 cu. ft. per day.

The 85-million cu. ft. of gas that were injected to sweep the test area will recover practically all of the LPG, the operators feel.

The four wells in the test area are under a special allowable of 600 b/d.

Sunray lauds the New Mexico Oil & Gas Commission for the cooperation it gave to operators in setting up the Bisti pilot flood.

"Without its cooperation, we would have been years in getting such a project under way," says an engineer.

Each of the four wells has been producing 150 b/d. This compares with normal allowables for this area of 25 b/d to 20 b/d in recent months.

Before the pilot program began, considerable study went into the selection of the test area, and the best method of recovery for Bisti.

The Lower Gallup formation—at an average depth of 4,900 ft.—seemed to be a timely candidate for such a project. The six-month interval has afforded a "quick" appraisal of the operation.

The formation is of Upper Cretaceous age, and is made up of layers of sandstone, sandy shale, and shale, with traces of bentonitic clay. Permeability varies from less than 1 millidarcy to a high of 400 millidarcies.

The best-developed productive sands follow the crest of a long, narrow sandbar, trending northwest-southeast. The stratigraphic trap dips 70 ft. per mi. northwest.

The reservoir has an average pay thickness of 135 ft., of which only 10% to 20% has a permeability of more than one millidarcy.

Many wells have been successfully fractured to stimulate fluid flow through the reservoir sections of low permeability.

Initial field development at Bisti began in a structurally low area containing undersaturated crude. Later, however, a 3,600-acre gas cap was encountered along the structurally high southeast portion of the field. There is no water drive, apparently, although meteoric water has been found in a few wells along the northeast edge.

In the test area of the field, the performance recovery mechanism is fluid expansion.

Before the flood was started, the engineering committee ran a 4,500-psi. vaporizing gas-drive study. This high-pressure study revealed that only partial miscibility could be achieved, with a recovery factor of only 47% in the swept portion of the reservoir.

Complete miscibility could be achieved at much lower pressures by injecting the LPG slug between the reservoir oil and the injected gas, the study showed.

The pilot project should be a good example of how to get a miscible-phase displacement field test started while reservoir pressure is above the bubble point, according to Robert E. Brooks, senior petroleum engineer for Sunray.

Brooks told the American Institute of Mechanical Engineers about the pilot operations at a meeting this week in Tulsa (page 29).

"The highest degree of success should be achieved in miscible displacement projects before equilibrium gas saturation is reached," said Brooks. "Therefore, an LPG miscible displacement pilot project should be started early in the life of a field if evaluations are to be made quickly enough to obtain maximum recovery on a field-wide basis."

"Having instituted this pilot project at Bisti when gas-oil ratios were low, and the reservoir pressure was above the bubble-point, we felt we would be able to evaluate fully the effects of the pilot project, and possibly extend it to the whole field before the bubble-point was reached," says the company.

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Drilling in Lake Maracaibo is The Offshore Company's new barge V-1. Barge V-2 is also working in this area. These units are the most powerful Diesel-electric rigs yet to work in Venezuela. Each is capable of drilling in excess of 12,000 feet.

The Offshore Company Goes to Venezuela

—picks Electro-Motive Power with overseas service and parts facilities for two new Diesel-electric barges

The Offshore Company, first to use Electro-Motive Power in the United States, is now first to use this Diesel-electric equipment in Venezuela on their new barges, V-1 and V-2.

Each of these modern barges contains Electro-Motive equipment of 2700 horsepower, making them the most powerful Diesel-electric rigs sent to work in the Lake Maracaibo area.

Behind The Offshore Company's choice of power for the new barges was experience with Electro-Motive Power on their record-breaking mobile platforms Nos. 54 and 55 and their fixed platform No. 25. But most important was the knowledge that they could get *local* service for Electro-Motive equipment from General Motors de Venezuela.

Factory-trained personnel head up this facility through General Motors Overseas Operations. It offers the same superior service for Electro-Motive equipment found in the Gulf. Here too, complete facilities are offered for both engine and electrical components—*one responsibility* for the complete power system.

If your interests lie in moderate or deep drilling in this country, Canada, South America, or elsewhere, look into the advantages of Electro-Motive equipment with established world-wide service facilities. See your Electro-Motive representative for details.

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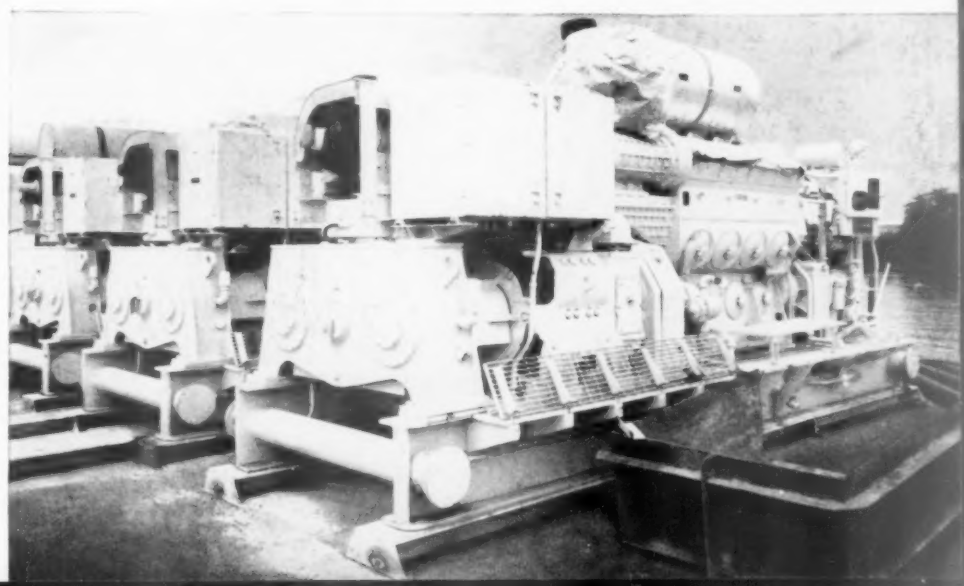

Three Electro-Motive engine-generator sets of 900 hp each supply power to drive motors on mud pumps and draw works. These sets are heat-exchanger cooled. Sets are also available with air cooling or keel-cooling systems.

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For practical solutions to your cementing problems, call your Diacel field engineer. Or consult your Diacel Technical Handbook for information to determine thickening time and compressive strengths of slurries at various temperatures, as well as other important data to help you formulate the best cement system for each particular job. Write for your free copy today, or obtain it from your cement service company.

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Imagination: A Key to More Oil

In a few weeks, C. C. Winn, San Antonio operator, will again test his conviction that imaginative well data interpretation can find considerable oil in overlooked areas.

Winn will spud a test on acreage he has acquired himself and received on farmouts from Phillips Petroleum Co. and Shell Oil Co., in Maverick County, Southwest Texas.

In this part of the Texas-Mexico border country, the Chittim anticline is the dominating geological feature.

Since the 1920's, upwards of $10-million has been poured into exploratory work in the county, reaping for the most part a harvest of dry holes.

Winn and his staff assembled and studied various kinds of geological and geophysical data on the area. Winn feels that some of the dry holes drilled in the past years might have been producers had there been the right kind of interpretation, and had modern drilling and completion techniques been employed.

Says Winn: "The bulk of my reserves lie in areas that have been walked away from."

Winn has another basic philosophy: "No fixed ideas." He likes to stick to areas with a "good productive history," but he does so in an unorthodox manner.

"I'm not a conformist," Winn explains. "We don't have fixed thinking here."

"This means," says one of his staff, that "a dry hole doesn't necessarily condemn anything any more. It just gives you more information."

In practice, Winn and his staff go by what they see and deduce from such data sources as well logs and coring reports, held up to the light of an area's basic geology.

"There's a pattern to oil reservoirs, we think," says Winn, "a pattern as to where they are located. Wherever possible, we stay in good trends of known productive history and look for the geological 'oddities.'

"We think there is a lot of oil yet to be found in South Texas, associated with large producing reservoirs."

So far, this operating premise has paid off for Winn with at least eight new fields or field extensions, and a total of 96 producers—all since 1954.

Winn holds 8,670 producing acres and 236,485 nonproducing acres, including the Maverick County property.

Oil production from his interests totals about 1-million bbl. annually.

FLEXIBLE THINKERS: C. C. Winn (second from right) and his staff pore over maps.

The bulk of it comes from 31 reservoirs in 12 Texas Counties.

Since 1954 Winn has:

- Extended or opened production in several Nueces County fields. Among the discoveries: West Minnie Bock, London West, and London fields. Among the extensions: London Gin and London Southeast.
- Reactivated the Bridwell field in Duval County. Winn found oil and gas sands in the Hockley formation that had been overlooked in earlier testing. He also discovered Johns field, in the same county.
- Discovered Davy Crockett field, in Zapata County, which, appropriately, produces from the Crockett formation. (Incidentally, it was discovered during Davy Crockett week.) This was the 5,000th oil field in Texas. (There are now 6,146.)

Last year, Winn's technique resulted in a 46% success ratio for a 67-test drilling program that included 51 wildcats.

Of the 67 tests, 22 were oil wells, 9 were gas wells, and 36 were dry holes.

Of the 51 wildcats in the program, 15 were producers and 36 were dry—a success ratio of 29%.

This year, Winn expects to drill about 75 tests.

Possibly the toughest challenge to Winn's operating techniques has been the Johns field, Duval County, Southwest Texas, a 1956 discovery in a graben-type structural trap.

A test abandoned in 1938 was the basis for the Johns discovery. The test, drilled in an effort to extend the nearby Fitzsimmons field, had shown oil and oil-cut mud on drillstem test. But apparently the structural conditions failed to square with those in the Fitzsimmons, so the test was plugged.

Winn decided that a new reservoir might be involved. He moved updip and drilled the discovery, No. 1 Mew, finding 2 oil sands and 7 gas sands.

Winn was strongly advised against drilling into the graben at Johns field, because such oil accumulations are rare.

That made the Johns field decision a touchy one. But it was the same type of decision that led to Winn's extension of the London Gin (Massive Catahoula) field in 1954, which gave him his first real start.

At London Gin, there were 13 dry holes adjacent to a block of approximately 1,600 producing acres. The tipoff to Winn was the record of a 20-year-old Wellington Oil Co. test that had been cored but not tested before plugging.

There were several dry holes between the Wellington test and the London Gin field, so Winn again reasoned that the well might have been on a separate structure.

The core record indicated that the Massive Catahoula was above the known water-oil contact in the London Gin reservoir to the east.

Winn gives considerably more weight to the value of "my friends in the oil business" than to "brains."

"I didn't do anything by myself," he says. "It's your friends who put

*A trademark

you on to these things. It isn't brains. If you fumble it after that, it's your own fault."

Furnishing much of the financial sinew for Winn's operations is "outside money." His participants are "the same people who were with me to start with."

Winn, the son of an oil old-timer, has lived a classic story of a career in oil.

Winn describes his father, C. A. Winn, as "my biggest asset." The latter now handles all the company's major production and drilling problems.

The younger Winn "made" many of the early Texas oil booms as a child, and was roughnecking at 14. Later, he attended both Texas A&I College and the University of Texas, leaving without a degree in 1948.

A period of brokering leases on his own in Corpus Christi and San Antonio followed college, with Winn "trying to put together deals." When he found himself completely broke, he would go back to roughnecking for another grubstake.

"I'd go any place where I could put together a deal," he recalls.

Energetic and young—he's now only 29—Winn feels that the common trait of independents is the determination to make it on their own, come what may.

An associate, who has worked with both independents and majors, sums up Winn's thinking process this way:

"He's the damndest fellow I ever saw. He has the mind of a 60-year-old man when it comes to business, yet you're liable to see him suddenly sit right down on the floor and play marbles with a kid.

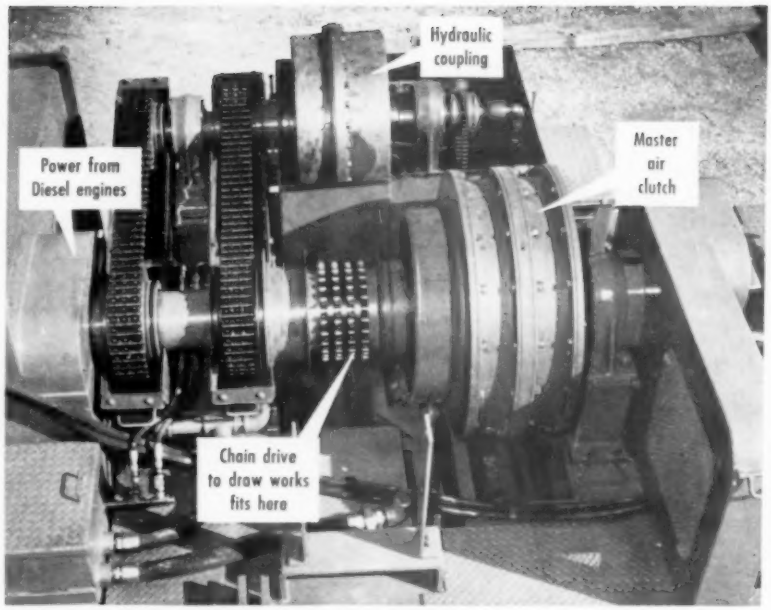
"The thing that stands out is his uncanny sense of timing. He'll just sit on a deal until you almost think he's asleep at the switch. Then he'll start moving so fast it's hard to tell what's happening—after he's ready and thinks the time is ripe."

Winn's newest venture departs a little from his previous exploratory path. But the route still is marked with the signs that led to other discoveries: dry hole data.

There is no close "association" in Maverick County with producing reservoirs. So Winn's move here is somewhat different from past procedure.

He isn't ready to discuss specifically just what data he's working from or where he will drill his first hole.

But, again, dusty records of previous dry holes provided the clincher for his belief that considerable reserves will be found.



HYDRAULIC COUPLING provides fluid control when master clutch is de-aired.

'Run-Around' Aids Drilling

A hydraulic coupling that provides drillers with a "soft" fluid-drive "clutch" for the rotary, drawworks, and sandline has been introduced by National Supply Co.

The 24-in. hydraulic coupling was installed on three National 110 rigs, which were set up and tested recently in Houston. The rigs, designed for drilling in the 9,000-13,000-ft. range, then were broken down and crated for export shipment. These three rigs are for International Drilling Co., for drilling in Libya and Nigeria.

The drive — named the "Run-Around"—consists of a small fluid coupling mounted on a countershaft of the front engine frame.

It permits a small amount of power to be diverted from the combined power provided by all of the engines. This diverted power, approximately 300 hp., maximum, may be used to run the rotary—via the drawworks—under very accurate control.

The coupling gets its name from the fact that the driller "runs around," or bypasses, the de-aired master clutch.

Use of the "Run-Around," especially on rigs with large engines, eliminates the necessity of separating the front engine from the other engines while drilling.

All engines will be engaged in driving the pump or pumps—thus working all engines equally. Without this arrangement, there are times when the front engine runs lightly loaded, while the remaining engines may be heavily loaded due to the pumping requirements.

To hoist pipe, the driller puts the air to the master clutch. At any time, and instantly, the driller can de-air the master clutch and, at the same time, start filling the spinning ring of oil in the hydraulic coupling.

When a rig is equipped with the "Run-Around," the hazard of the drill pipe being exposed to large portion of the total rig power is eliminated.

This is so because the small hydraulic coupling will slip when the rotary table load reaches a level that is a little over 250 hp.

The coupling device also makes it possible for a driller to pull a sandline very gently.

The National 110 drawworks has a 1,100-hp. rating, 50-in. brake rims, 27-in. drum grooved for 1¼-in. line, and 2-in. triple chain.

Each of the rigs at Houston were powered by three White Superior 8-cylinder supercharged Diesel engines; Cameron and Hydrill blowout preventers; a Parkersburg brake; and a National three-section drive group with Gyrol Fluid drives and two National G-700 pumps.

The "Run-Around" was first installed on a National 110 rig supplied to Superior Oil Co. about a year ago. The development wasn't made known generally, however, until the three Type 110 rigs were assembled at Houston.

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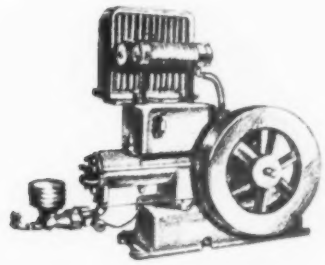

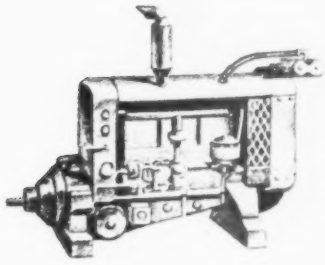

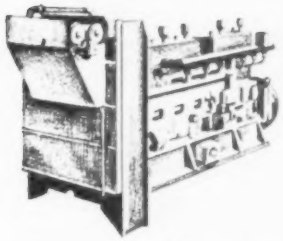

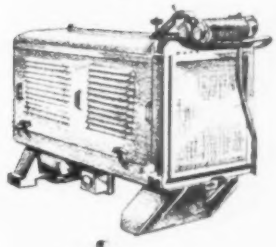

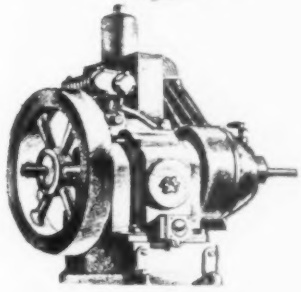

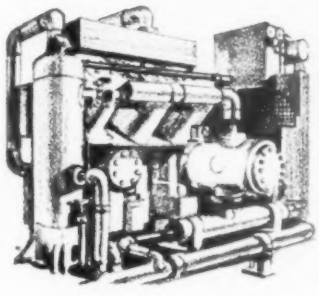

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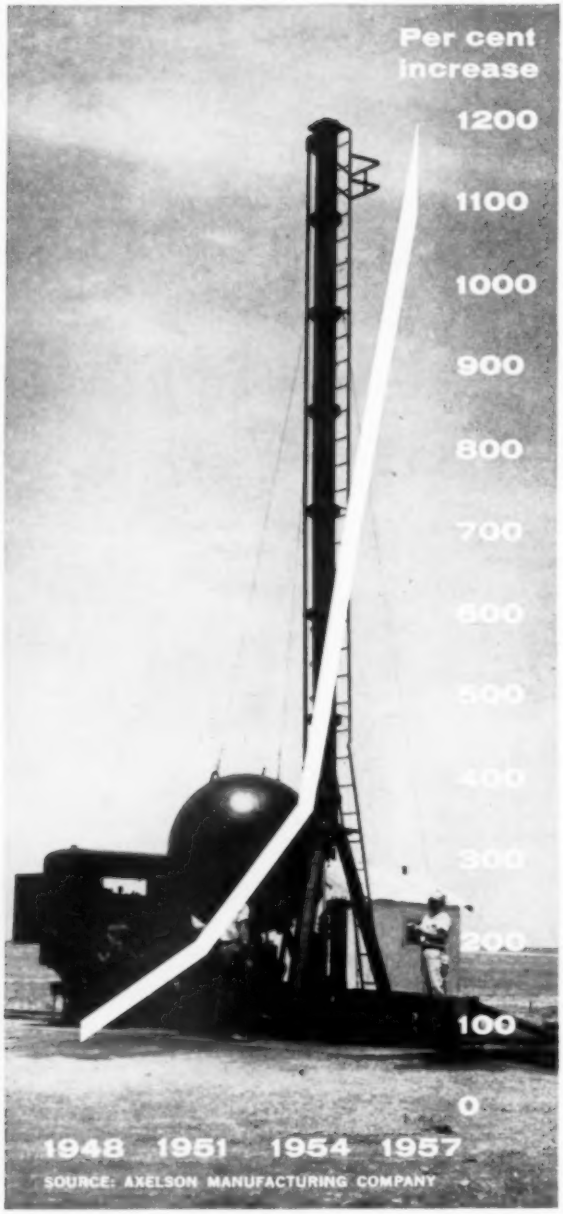

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California: Big Prize Offshore

A prize of more than 10-billion bbl. of oil probably lies in the offshore portions of three southern California basins, if legislative conditions are favorable for its recovery.

A great part of this offshore oil may never be recovered in the foreseeable future unless state and industry leaders establish regulations under which the oil can be produced economically and competitively, says Joe B. Hudson, Monterey Oil Co.

The basins are the Santa Maria, the Ventura, and the Los Angeles. The onshore portions of the basins have an estimated ultimate yield of 9-billion bbl., Hudson told the 42nd annual joint meeting of the American Assn. of Petroleum Geologists and the Society of Economic Paleontologists and Minerologists which met in Los Angeles last week (PW—Mar. 14'58,p11).

The Santa Maria Basin covers 1,000 sq. mi., of which 50% is offshore. It has produced 410-million bbl. of oil, and has onshore reserves estimated at another 140-million.

The Ventura Basin covers 4,000 sq. mi., of which 50% is offshore. It has produced 1½-billion bbl. of oil, and has estimated onshore reserves of 800-million bbl.

The Los Angeles Basin covers 2,400 sq. mi., 40% of which is offshore. The basin has produced about 4.7-billion bbl. of oil, and has onshore reserves totaling 1.3-billion bbl.

"Since these basins will produce an ultimate of 9-billion bbl. onshore, and some 50% of the sediments fall in offshore waters, it is reasonable to expect that these offshore areas contain in the neighborhood of 10-billion bbl.," Hudson said.

He added: "Since the depth to which these basins have been explored is only about half their total, we should add another factor for deeper oil, which would be about 4-billion bbl., giving a total of about 23-billion bbl. both onshore and offshore."

Offshore seismic and geologic exploration by the oil industry in the past decade has turned up well over half a hundred structures that have been mapped in detail, Hudson said.

The offshore portion of the Santa Maria basin extends northwestward, Hudson said. The Ventura Basin trends east-west, with three principal lines of folding, the Montalvo, the Rincon, and the Elwood. In the Los Angeles Basin, the principal offshore area is a graben, which falls between the Inglewood fault onshore and the Malaga Cove fault, which roughly parallels the Inglewood.

The amount of seismic work that has been done in these three basins amounts to 200 crew months.

Seismic work alone has cost $25-million. Exploration costs, said Hudson, are about six times higher than for other regions, because of state regulations and difficult geologic conditions.

All the work has been done in a narrow strip 10 mi. wide and 200 mi. long, giving a seismic coverage of about 125 shot points per sq. mi.

The Pacific Coast states are now producing less than 1-million b/d of oil, with about 7% coming from offshore locations.

Hudson said that California has about 250 oil fields, but that more than 50% of production comes from a dozen large fields.

The other California basins adjacent to the coast are the Humboldt basin, in northern California; the Half Moon Basin, south of San Francisco; and the Salinas Basin, 150 mi. south of San Francisco.

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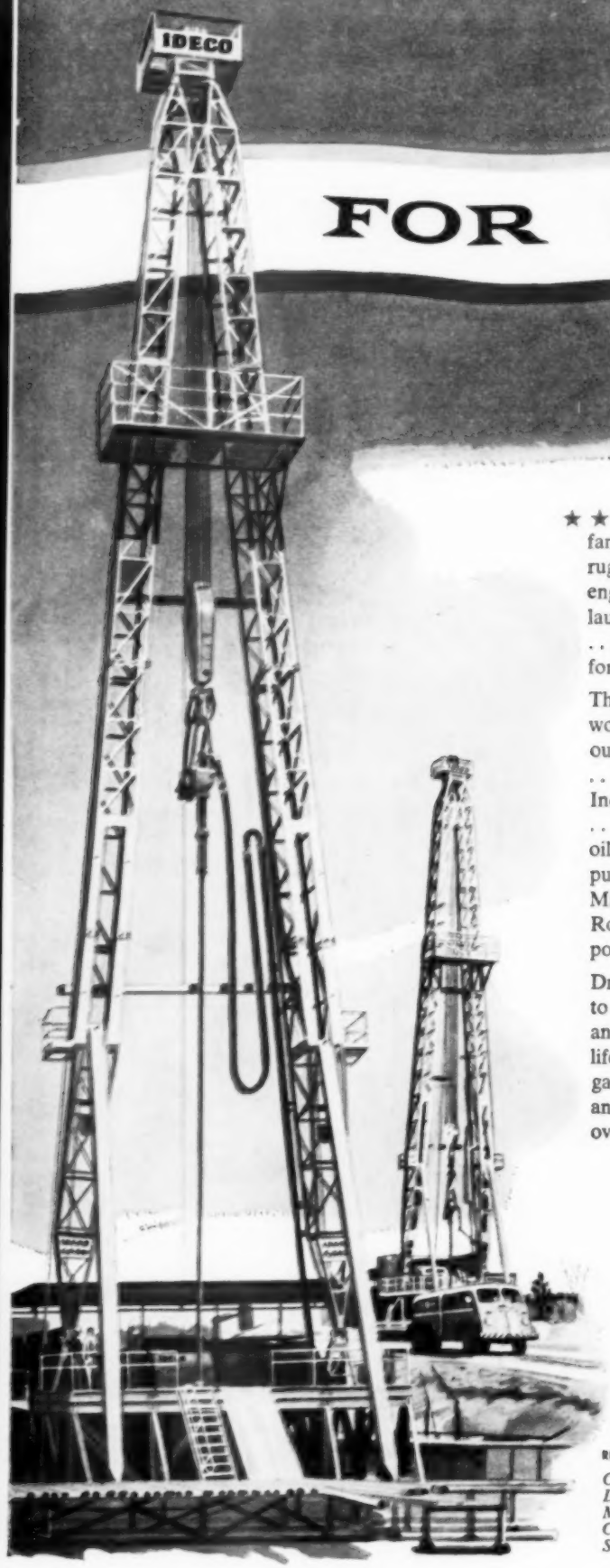

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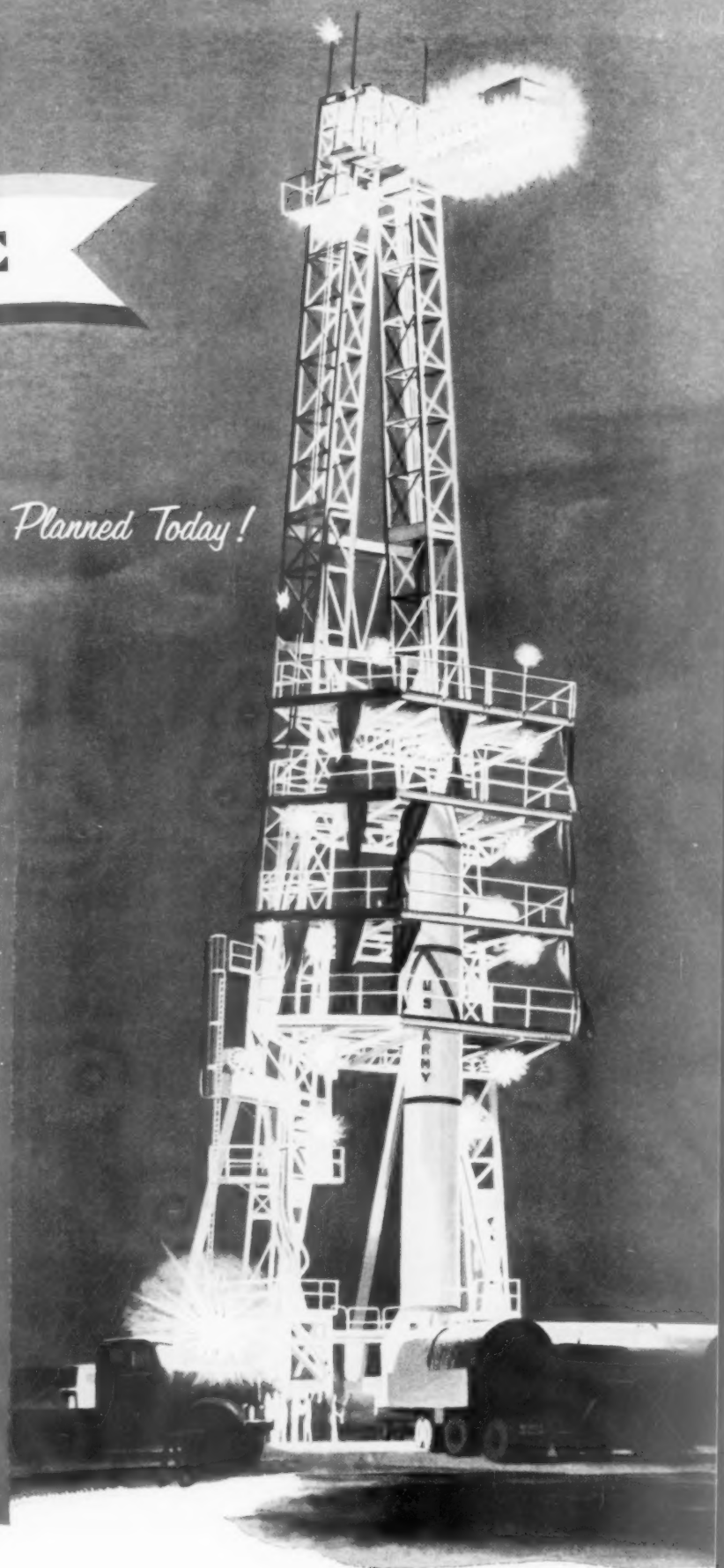

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Clark Turbo-Mobile power plants, rail-mounted, supply emergency electricity for Navy Yards, docks, hospitals, and major disaster areas. Unit has capacity of 6750 kilowatts, enough power for a city of 12,000.

High pressure compressors from Clark . . . instrumentation and other electronic equipment from Southwestern Industrial Electronics . . . are used in guided missiles and many other important military applications.

Dresser-Ideco supplies structural equipment used in military defenses, including radar outposts for our remote Arctic warning system as well as microwave, radio and television towers.

Pacific provides the Navy with Turbo pumps for ships' main and boiler feed pumps. Equipment from other Dresser companies is also used on both merchant ships and naval vessels.

WHERE IN THE WORLD IS THIS WEIGHT INDICATOR?

One thing is certain—it's not in the torrid zones, but it could be. As a matter of fact, Cameron Weight Indicators are found on drilling rigs in every oil producing area of the free world. Drill bits bite better and make straighter holes because the Cameron mechanical weight indicator continues to function accurately and without fail regardless of temperature changes. There is no possibility of high pressure fluid leakage or temperature reflection because these indicators have no hydraulic system. The large yellow dial with bold contrasting black and red numerals makes the indicator readily visible from any point on the rig floor. Its case is oil-filled (like the Cameron Pressure Gauge) to provide a viscous damping of dial motion and to prevent damage from vibration. For peak drilling efficiency and for all bottom hole operations requiring precise weight control COUNT ON CAMERON Weight Indicators for the accuracy you deserve.

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What's New / IN EXPLORATION, DRILLING, PRODUCTION

Quadruple Completion Hearing Is Set

The Texas Railroad Commission will hear Magnolia Petroleum Co.'s application for the first quadruple completion on Apr. 8.

The company seeks approval to produce its No. 8 Santa Cruz Farms, in the San Carlos field, Hidalgo County, from four reservoirs (PW—Mar.14 '57,p22).

The company estimates a potential gas flow from the four horizons at over 8-million cu. ft. per day.

Magnolia says the quadruple completion would save drilling costs, allow production from reservoirs otherwise too small to justify a well, and permit production from all four levels simultaneously.

•

The North Dakota Industrial Commission has opened hearings on an application by Amerada Petroleum Corp. to unitize the state's two largest oil fields, Beaver Lodge and Tioga.

Amerada testified that proposed waterflood operations could be under way within 18 months after unitization. Injection wells will be drilled around the periphery of the two fields: Current planning calls for about 40 of them.

The company has secured the signatures of operators in the fields, but still must secure the signatures of royalty holders on some 515 tracts involved. Amerada sets April, 1959, as the target date for securing approval from 85% of the royalty holders.

Some engineers predict that production at Beaver Lodge would begin a serious decline by 1962, and that the decline would begin in Tioga by 1963, unless secondary recovery is started soon.

•

Gulf Oil Corp. may reenter and test No. 1 Sterba, the deepest test ever drilled in Oklahoma.

Reports say that Gulf would test the Deese formation, above 7,500 ft.

A Gulf official at Tulsa would neither confirm nor deny the reports this week.

The test was drilled last year to a total depth of 20,426 ft. in the Cement field, Caddo County. It was plugged back to the Springer sand at 15,000 ft., where a show of oil and gas was reported.

•

The Alberta government will hold a sale Apr. 17 of oil and gas rights on about 495,000 acres in both proven and unproven areas throughout the province.

More than 19,000 acres will be offered in such proven areas as Joffre, Keystone, Pembina, Pincher Creek, Sturgeon Lake South, Sundre, and Swan Hills.

About 468,000 acres will be offered in Big Bend, Clear Hills, Crow Indian Lake, and Virginia Hills provincial reserves.

•

A new mud-dispersing agent has been introduced by Dowell Inc., Tulsa, under the trade name "Mudlax."

"Mudlax" is designed to remove mud filter cake from the face of the formation, remove large quantities of mud lost to the formation, and free stuck drill pipe.

The agent, when used with kerosine, crude oil, or diesel oil, is said to dehydrate bentonite mud particles. The oil wets the particles and suspends them so that the mud can then be swabbed out of the critical area around the well bore, the company says.

•

The U.S. Geological Survey has approved Standard Oil Co. of California's Iron Wash Unit, Emery County, Utah.

The block includes 24,965 acres, of which about 23,000 acres are federal land.

The unit is northwest of operations in the Paradox Basin. Scattered drilling has been done to shallow depths around the unit, but it is in about the most remote spot—exploration-wise—that can be found in the southern half of Utah.

Location for the initial test on the unit has not yet been made.

•

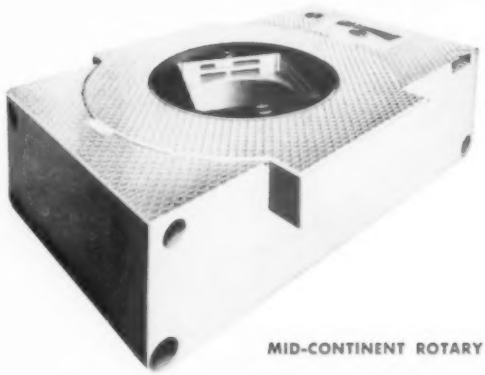
Drilling continues at a strong pace in Alaska.

In the Widebay-Kanatak area, on the Alaska Peninsula, Humble Oil & Refining Co. is reaming to run casing on No. 1 Bear Creek Unit, a joint

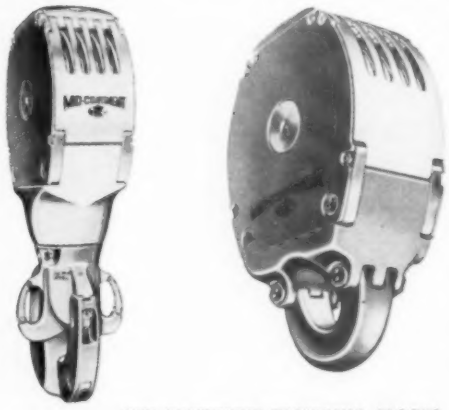
MID-CONTINENT

...a new name for a famous line of drilling equipment

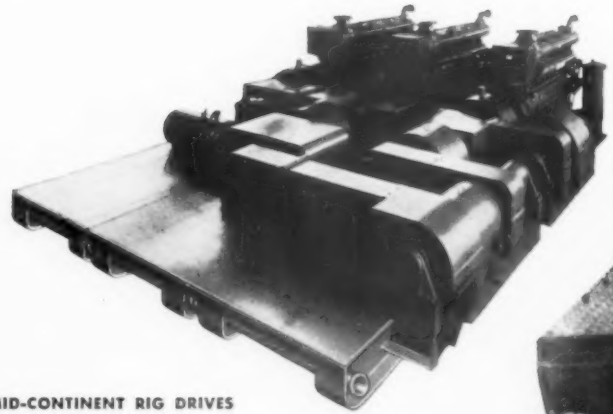
UNIT RIG PRODUCTS WILL



MID-CONTINENT ROTARY TABLES



MID-CONTINENT TRAVELING BLOCKS



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Expanded field stocks of drilling equipment and parts — that's the advantage to the drilling industry and the purpose of Mid-Continent's newly announced equipment program expansion. All Unit Rig products — drawworks, drives, blocks, rotary tables, and other products still in the design stage — now carry the MID-CONTINENT name and will be sold by Mid-Continent Supply Co. Unit Rig factory-trained service personnel will continue maintenance of Mid-Continent machinery throughout the world. More than ever before, the oil industry can look to Mid-Continent for supply — where and when you need it.

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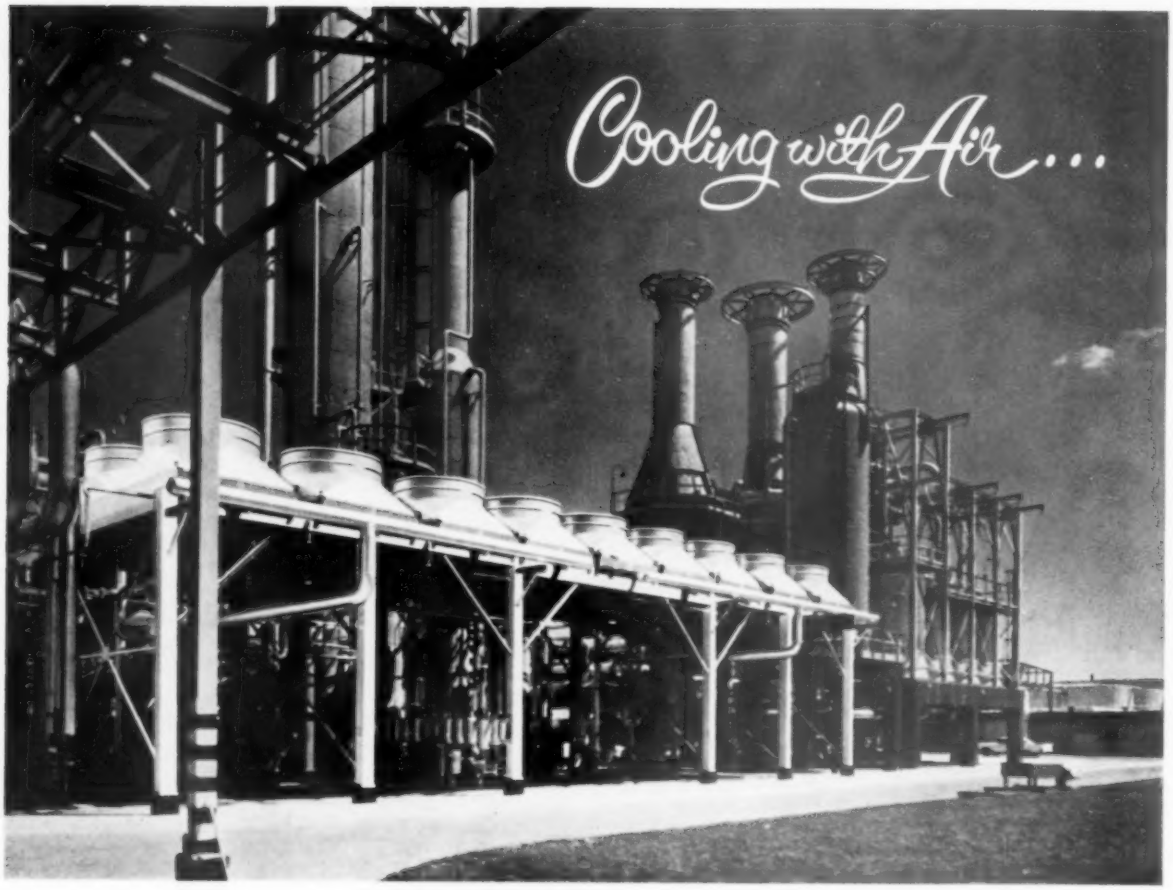

THE MODERN TREND IN OIL REFINERIES

HUDSON Solo-aire units pictured above operate in a large Texas Gulf Coast Refinery, in which Solo-aires are used for a complete range of refinery services, transferring 300 million BTU's per hour directly to air.

Over-all economic comparisons of HUDSON Solo-aire cooling versus water cooling for new refining units almost invariably result in selection of Solo-aire units for much or all process cooling.

In two complete 40,000 barrel sea-side refineries now being constructed abroad by one of the world's largest refiners, HUDSON Solo-aire units will be used for ALL process cooling services. NO WATER WILL BE USED FOR PROCESS COOLING.

In the United States in a 40,000 barrel refinery being built adjacent to an unlimited water supply, 50% of the total dissipated heat will be transferred directly to air through HUDSON Solo-aire units.

Operating results of HUDSON Solo-aire units installed in oil, gas and chemical plants throughout the free world have led to continuing repeat installations.

For new process installations and for replacement of high maintenance water-cooled equipment, Solo-aires offer in most cases clear-cut advantages. Let HUDSON assist you in objective analyses of air versus water cooling.

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test with Shell Oil Co. Casing reportedly will be run to about 8,600 ft. The test is 280 mi. south of Richfield Oil Corp.'s discovery on the Kenai Peninsula.

In the Yakutat area, Colorado Oil & Gas Corp. has abandoned its test, No. 1-A, section 2-28s-34e, at 11,765 ft. The wildcat reportedly had encouraging gas shows at two intervals, and the operator is expected to spud another test in the area within six months.

In the Ninilchik area, on the southern Kenai Peninsula, Standard Oil Co. of California is preparing a location for No. 1 Deep Creek Unit, section 14-2s-13w, about 50 mi. southwest of the Kenai discovery.

•

The Washington State Division of Mines & Geology has granted a drilling permit to Pleasant Valley Gas & Oil Co., Vancouver, B.C., to drill an 8,000-ft. test in Lewis County.

The permit was requested by J. W. Tanner, who has been associated with other oil operations in the state, including Sunshine Mining Co.'s producer on the coast.

•

The Wyoming Oil & Gas Conservation Commission has set hearings on four secondary recovery and spacing applications.

A hearing was set for Mar. 24 on Pan American Petroleum Corp.'s request to inject residue gas in the Cottonwood Creek field, Washakie County. Another hearing was set for the same day on Continental Oil Co.'s application for a waterflood in the Dakota sand for the Big Muddy field. On Apr. 1, the commission will hear Pan-American requests to amend the area now covered by 160-acre spacing in the Cottonwood Creek field, and to set 40-acre spacing on 2 sq. mi. of the South Glenrock field, Converse County.

•

The Wyoming Land Board approved 67 new oil and gas leases on state-owned land at its regular monthly meeting in March.

Thirty of the leases were in Lincoln County, where natural gas discoveries have stimulated exploration in the past year.

•

North Dakota now has more than 1,000 producing oil wells, just a month short of the seventh anniversary of the discovery of oil in the state.

A total of 1,751 tests have been drilled in the state. Of that number, 1,022 were completed as oil producers, but 19 have since been abandoned. The total now stands at 1,003 operating oil producers.

•

A wholly-owned Canadian subsibidiary has been acquired by Hycalog, Inc., well logging and rig manufacturing company of Shreveport, La.

The Canadian company will operate under the name of Prairie Coring & Supply, Ltd., and will serve as a distributor for Hycalog products.

•

Correction

In the issue of Mar. 7, p.58, General Geophysical Co.'s magnetic recorder system, the Geocord, was listed as weighing 145 lb. per case.

One of the chief advantages of the Geocord is its portability and light weight—only 45 lb. per case.

•

Drilling Highlights

South Louisiana — Richardson & Bass et al No. 2-K LL&E, section 39-18s-27e, Plaquemines Parish, flowed 200 b/d of oil on drillstem test through ¼-in. choke and perforations at 17,441-47 ft. and 17,454-65 ft. This test is between the Lake Washington field and the world's deepest producer, in the Weeks Island area, 1 mi. from each.

New Mexico—Phillips Petroleum Co. No. A-2 Navajo, section 16-41s-24e, San Juan County, was completed flowing 1,620 b/d of 42-gravity oil through 1-in. choke and perforations in the Paradox at 5,508-34 ft. and 5,613-38 ft. M. A. Long, Phillips geologist, says the well proves that the Ratherford and White Mesa fields are interconnected.

Louisiana Offshore — Gulf Oil Corp. No. 2-QQ State Lease 195 was completed as a new pay discovery in the Main Pass Block 47 field. The well flowed at the rate of 369 b/d of 28-gravity oil through 12/64-in. choke and perforations at 8,334-44 ft. Field production so far has been from 9,700-800 ft.

West Texas—W. H. Hunt No. 1 Windham, section 16, block 2, MK&T survey, Upton County, flowed 129 bbl. of oil in 15 hours through 20/64-in. choke and perforations in the Wolfcamp at 8,507-15 ft. after acidizing. The project is a reentered 13,050-ft. Ellenburger failure, 3¾-mi. east of King Mountain pool.

British Columbia—Texaco Exploration Co. et al No. 1 Boundary Lake, 1sd 10-34-87-16w6, flowed 2.2-million cu. ft. of gas per day on drillstem test of the Triassic at 3,635-724 ft. The project, 6 mi. south of gas production, is the fourth gas strike in the Boundary Lake area.

Texas Offshore—Shell Oil Co. No. 1 State of Texas Tract 888 was completed as the fourth producer in Neuces County's GOM 889 field. On open flow test, the well flowed 68-million cu. ft. of gas per day and 65 bbl. of condensate per 1-million cu. ft. of gas through ¼-in. choke and perforations at 11,820-70 ft. The offshore completion is 18 mi. southeast of Corpus Christi.

East Texas—Humble Oil & Refining Co. No. 1 Virginia Worley Moore, A. P. McWilliams Survey, Van Zandt County, was completed for 2.4-million cu. ft. of gas per day and 15 bbl. of condensate per 1-million cu. ft. Production is from the Rodessa at 8,629-43 ft. Nearest production is several miles southeast in the Opelika field.

Oklahoma—Pan American Petroleum Corp. No. 1 Schoenhals, section 23-20n-25w, was completed as a new Morrow discovery in Ellis County. The well was treated to flow 12 bbl. of distillate and 1.5-million cu. ft. of gas in 4½ hours through 9/64-in. choke and perforations at 10,745-47 ft. Estimated open flow of gas is 5.7-million cu. ft. per day. The recent discovery is 13 mi. southwest of production.

In Beaver County, Republic Natural Gas Co. No. 1 Nine, section 21-3n-27e, flowed gas at the rate of 2.4-million cu. ft. per day on 1-hour drillstem test of the Hoover sand at 4,586-604 ft. Test of the Tonkawa at 5,613-26 ft. yielded gas at the rate of 1.1-million cu. ft. per day. Operator is drilling ahead to the Morrow and Chester before completion. The test is 3 mi. west of the Highland gas district.

Wyoming—Ohio Oil Co. No. 1 Wamsutter Unit, section 12-20n-95w, Sweetwater County, flowed 4.3-million cu. ft. of gas per day through ¼-in. choke and perforations at 9,744-56 ft. and 9,650-725 ft. in the Mesaverde. It is the first test on an 85,000-acre block.

Japan Plans Petrochemical Export Role

With a boot-strap-lifting operation, Japan hopes to garner part of U.S. petrochemical-export markets as its own petrochemical industry goes on stream.

U.S. petrochemicals exporters soon will be bucking Japan's new-born petrochemicals industry in their bid for foreign markets.

Japan, a late starter in petrochemicals, has now forged into commercial production of its first major petrochemical, polyethylene. This is but the beginning of an ambitious Japanese program to export petrochemicals to the world.

Two polyethylene plants went on stream this month, and a third is due soon.

The two plants, one for Mitsui Petrochemical Co. at Iwakuni, Japan, the other for Sumitomo Chemical Co., Ltd. at Yokkaichi, Japan, will produce about 22,000 tons of polyethylene this year. Additional tonnage will be available from the Mitsubishi Chemical Industries, Ltd., plant, which is due on stream soon. In 1957, Japan imported only 18,000 tons of polyethylene, all from the U.S.

Japanese sources are confident that polyethylene production will double or even treble during 1959.

Japan, plagued by shortages in raw materials, capital, and technology, was slow to get started in petrochemicals.

Dependence on imported oil has been reduced by use of oil waste.

Capital lack was overcome by the "Zaibatsu," Japan's prewar industrial giants.

For example, Mitsui Petrochemical was organized in 1955 with a capital of $700,000 from eight postwar Mitsui offspring. In 1957 this was increased to $3-million.

Mitsui Petrochemical's board of directors is headed by Ken Ishida, former head of Mitsui Chemical Co. Products will be marketed by Dai-Ichi Bussan, Mitsui trading company.

Total capitalization of Japan's petrochemical industry is now $92.5-million.

Technological shortcomings of the Japanese have been overcome by lineups with foreign firms.

Mitsui Petrochemical has an alliance with Karl Ziegler, of West Germany; Sumitomo with Britain's Imperial Chemicals Industries, Ltd.; Mitsubishi with Badische Anilin Soda Fabrik A.G., of Ludwigshafen; Showa (Denko) Electrochemical Industries, Ltd., with Phillips Petroleum Co.; and Furukawa Chemical Industries, Ltd., with Standard Oil Co. (Ind.). In addition, Monsanto Kasei Chemical Co., Ltd., is a 50-50 petrochemical partnership between Monsanto Chemical Co. and Mitsubishi.

Japan is not limiting itself to producing and exporting petrochemicals themselves; it also has an ambitious program to export petrochemical plants.

Negotiations are almost complete between Pakistan and five major Japanese firms (Kobe Seiko, Ishikawajima Heavy Industries, Shin-Mitsubishi Heavy Industries, Fuji Electronics, and Meidensha Electric) to build a $25.6-million urea-fertilizer plant at Fenchuganj, East Pakistan.

The plant will make 150,000 tons a year of urea from natural gas, and will be financed completely by the Karachi government. Japan Gas Chemical Co., under the supervision of the Japan Consulting Institute (a private group), will subcontract the construction to the five Japanese principals.

Brazil reportedly has asked for a similar deal, and is said to be awaiting detailed plans.

Greatest immediate impact on the Japanese economy from the new petrochemicals industry will be conservation of foreign-exchange credits.

In 1958, Japan plans to import 322,794 tons of raw materials, worth $33.3-million, from the U.S. This is 58% of Japan's total 1958 needs. Any reduction in these imports will help conserve Japan's hard-pressed reserves of dollar and sterling credits.

Atomized Dye Tracks Air Currents

A special dye, atomized into air currents, speeds the tracking of air movement for air pollution studies.

As developed by Stanford Research Institute, the technique evaporates the dye uranine (sodium salt of fluorescein) into moving air streams.

The dye particles, carried by the air, are recovered in filters at sampling stations. Dye concentration in the sample is found photometrically.

The "air tracker" uses a special nozzle to atomize the dye as very small particles, which float in the air to follow its currents.

The dye is dispersed as particles only 2 to 10 microns in size (one micron is about 0.00004 inches). Thus, it stays suspended in the air like a gas.

Speed and sensitivity for the new air-current analysis method are said to be excellent.

Two men can make 75 analyses an hour with the Stanford method. This compares to an hour per analysis with the old method of counting particles under a microscope.

Samples with as few as 20 particles of dye can be measured with satisfactory accuracy.

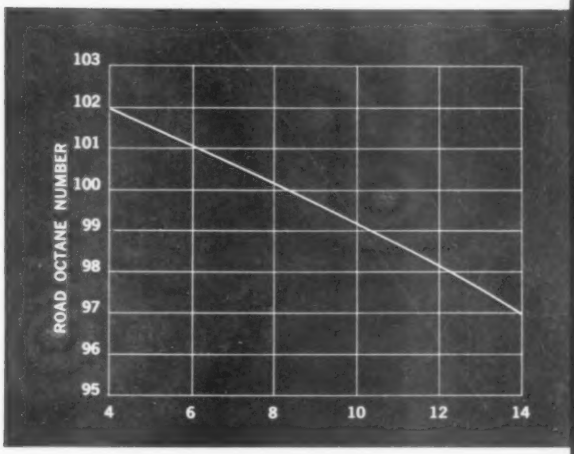
Studies are continuing, in an effort to apply the method to the analysis of dispersion of gases from hot stacks.

AIR-TRACKER has dye-atomizer (in ground) and air-sampler (being held).

To date, the method has been used for wind trajectory studies only. Materials known to be stable up to 500F are under consideration as dyes for hot stack gases.

SENSITIVITY AFFECTS ROAD OCTANE NUMBER

ALL GASOLINES 100 RES. O. N.

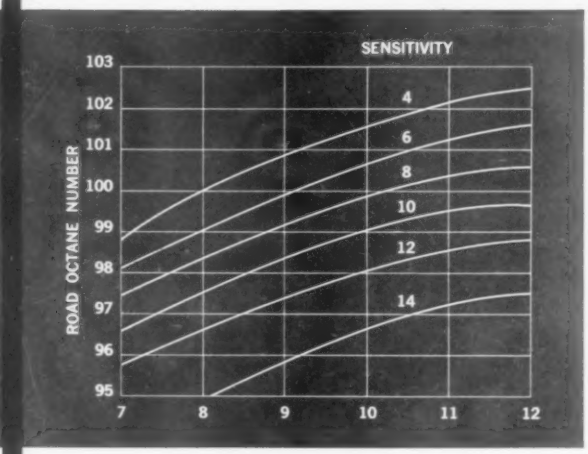


SENSITIVITY = RES. O. N. MINUS MOTOR O. N.

FIGURE 1

EFFECTS OF SENSITIVITY VARY WITH COMPRESSION RATIO

ALL GASOLINES 100 RES. O. N.



COMPRESSION RATIO

FIGURE 2

Sensitivity has new importance in relation to gasoline quality

BY KENT HYATT

Today these old and familiar terms of "sensitivity" and "road depreciation" have new significance for petroleum refiners. This is because advanced automatic transmission designs, changes in axle ratios and improved carburetion and fuel induction have increased the importance of motor method octane quality in determining the road performance of a gasoline.

To refiners this greater importance of motor method octane ratings and sensitivity means additional complications in blending gasoline stocks for optimum road performance and maximum processing economies.

One aspect of sensitivity which refiners must consider is illustrated in Figure 1. Here is shown a series of gasolines all at 100 research octane level. The road octane number of these gasolines decreases from 101 to 97 when the sensitivity is varied from 6 to 14. A further illustration of the effect of sensitivity is illustrated in Figure 2. Here again is a series of gasolines of 100 research octane number. It is apparent that for a given sensitivity, the road octane number is raised with an increase in compression ratio. And as in Figure 1, at a given compression ratio, the road octane number increases as the sensitivity is reduced.

In the near future we will try to illustrate how predicted compression ratio trends and related octane requirements as a function of sensitivity, are used in predicting gasoline quality requirements. E. I. du Pont de Nemours & Co. (Inc.), Petroleum Chemicals Division, Wilmington 98, Delaware.

KENT HYATT is supervisor of the road and electronics group in the engineering division of the main Du Pont Petroleum Laboratory. He is in charge of the sensitivity investigation described above.

See the "DU PONT SHOW OF THE MONTH" on CBS

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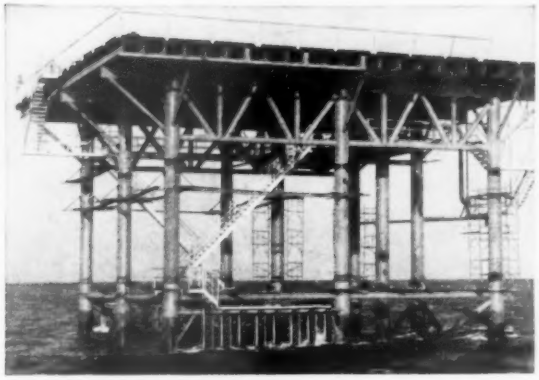
1 **Coated and uncoated oil pipe.** The top section of this 4-inch steel tubing was left uncoated; the bottom given a finish based on BAKELITE Brand Vinyl Resins. They carried the same 100 barrels of crude oil and 1000 barrels of high-iodine-content salt water every day for five months. The coated section shows no measurable damage.

2 **BAKELITE Brand Phenolic Resins** used in the coatings on these sucker rods have put an end to rust on the coupling threads. Several other types of coatings tested failed to give needed protection. Now large stocks of rods can be held outdoors indefinitely without fear of rusting.



3 **BAKELITE Brand Vinyl Resins** are in coating systems used on offshore drilling structures. These coatings are expected to last for two years, yet it takes only three weeks to cover the average structure. They provide excellent protection against the sand, mud, shale, and oil of drilling operations, as well as sea water.

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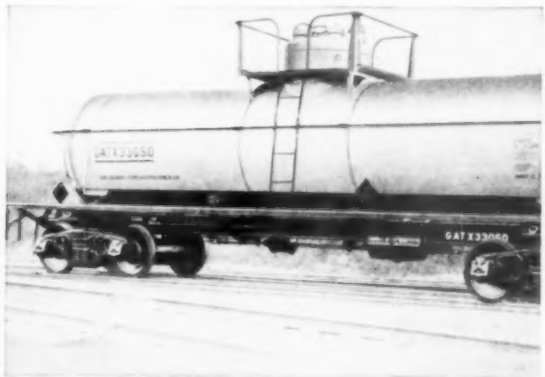
Throughout the petroleum industry, coatings systems based on BAKELITE Brand Resins are winning the battle against corrosion—and saving millions of dollars annually. Vinyl, phenolic and epoxy resins have repeatedly proved their resistance to chemicals . . . weather . . . corrosive atmospheres . . . salt water and other destructive agents.

Economy a major advantage. Protective coatings based on BAKELITE Brand resins adhere strongly to metal even under abrasion and impact. They provide years of trouble-free protection with far less maintenance . . . for more long term economies. They are quickly, easily, and economically applied. Case histories show that coatings based on BAKELITE Brand resins often last for years where others failed in months.

Bakelite Company will help you to find the best system for your needs. You work through a single authoritative source for a variety of resins. Bakelite Company has the vinyls, phenolics and epoxies to meet the needs of specialized coating formulations. The laboratory and research facilities of Bakelite Company are backed by years of experience in formulating resins for coatings to meet the most rigid requirements, including government specifications.

Free coatings booklet: "Bakelite Resins for Surface Coatings." Write Dept. CC-155.



4 **BAKELITE Brand Phenolic Resins** are used in the aluminum-pigmented finish on this tank car. For *nine years*, the coating has demonstrated continuous resistance to chemical fumes, abrasive particles, coal fumes that create dilute sulfuric acid.

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why chlorine-free SOLVO is important to producer and refiner

The organic chlorides found in most chemical paraffin removers remain in the crude—following it to the refinery where they adversely affect the performance of the catalysts used in catalytic reforming. Refinery tests show that as little as 5 gallons of paraffin "solvent" of this kind can contaminate as much as 30,000 barrels of crude, and affect the over-all refinery operation. *SOLVO contains no components which will adversely affect refinery operations.*

Paraffin accumulations such as these plug wells and flow lines, and rob operations of top dollar-efficiency. SOLVO has been designed to *prevent* such deposition and eliminate the necessity for frequent pulling and steaming jobs!

how SOLVO is used

SOLVO is available in a variety of formulas; most of which are dispersible in both oil and water, and may be used in either type of diluent. Such dispersions may be relatively concentrated or as dilute as 1%. SOLVO has a high flash point and low vapor pressure, making it safe to use.

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What's New / IN PROCESSING

WPRA Primed for Meeting

Universal Oil Products Co. will unveil details on two new processes, Alkar and Butamer, at the annual meeting of the Western Petroleum Refiners Assn. at San Antonio, Texas.

The meeting will run from Mar. 24-26. The theme of the opening session will be the role of asphalt for road paving. Further sessions will discuss motor fuel quality and refinery economics.

•

Huge Plant Projected

The largest gas processing and cycling plant in America will be built on the King Ranch, in Texas, by Humble Oil & Refining Co.

Capacity of the unit will be about 750-million cu. ft. of gas a day. A 30-in. gas transmission line will be laid from Southwest Texas to the Houston area as part of the total project.

Cost of the project will be about $77-million. Completion is expected in about two years.

•

First asphalt plant for the Peace River area is almost completed by X-L Refineries, Ltd., at Dawson Creek, British Columbia, Canada.

Capacity is estimated at about 350 bbl. of asphalt a day, which will be used for road paving in the Peace River area.

Initial operation of the unit is expected early next month.

•

Ethyl Corp.'s newly-completed vinyl chloride plant has gone on stream at Baton Rouge, La.

The new plant is the first in Louisiana to produce vinyl chloride monomer in commercial quantities.

Raw material for the plant is ethylene chloride (made by the reaction of ethylene and chlorine), which is "cracked" to make vinyl chloride and hydrochloric acid.

Contractor for engineering and construction phases of the plant was Catalytic Construction Co.

•

British Petroleum (Canada), Ltd., has selected Lummus Co. of Canada, Ltd., as over-all contractor for the proposed BP refinery at Ville d'Anjou, Montreal, Canada.

The new refinery is to have a capacity of 25,000 b/d. Main processing units will include crude distillation, catalytic reforming, catalytic cracking and polymerization, and hydrodesulfurization.

Construction will start within the next six months, with completion scheduled by mid-1960.

•

Continental Oil Co. is revamping the single-reactor reformer at its Billings (Mont.) refinery into a full-scale reformer.

The existing unit was used primarily to produce hydrogen for a hydrodesulfurization unit. After revamp by The Refinery Engineering Co., the reformer will produce about 1,500 b/d of high-octane gasoline components.

for QUALITY... QUANTITY... SERVICE

Whatever the GRADE and the VOLUME of

NATURAL GASOLINE

Just rely on WARREN'S versatile facilities to give you dependable deliveries ... WHERE and WHEN and the WAY you want them.

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PETROLEUM CORPORATION

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THE COST CUTTING SERIES . . .

FIGHT valve corrosion two ways

Ordinary valves fight corrosion in one way . . . special metals. The Rockwell-Nordstrom valve (available in iron, steel, stainless and other corrosion resisting metals) gives added corrosion protection because the seats are *never exposed* to the line. The *combination* of special metals and fully protected seating means that these valves stay in service longer and cost far less to use. And *positive shut-off* is assured by the exclusive Sealdport pressurized lubricant sealing. Rockwell-Nordstrom is the only complete line of lubricated plug valves. They cost no more to buy, often less, than ordinary valves. Write for details.

ROCKWELL MANUFACTURING COMPANY
PITTSBURGH 8, PA.

UP TO 13,000 b/d of natural gas liquids can now move to Chicago because . . .

Combination Line Is Ready

Texaco-Cities Service Pipe Line Co. has completed conversion of a 700-mi. Oklahoma-to-Chicago crude line to move natural gas liquids commingled with crude, the company told PETROLEUM WEEK this week.

The conversion means that the pipeline company, an affiliate of The Texas Co. and Cities Service Oil Co. (Del.), can now move up to 13,000 b/d of natural gas liquids on a continuous basis from the southwest producing area to the East Chicago refining area. In addition, the line can handle about 40,000 b/d of crude at the same time.

The natural gas liquids are being fed into the newly-converted 12-in. line at Cushing Station, Okla., from natural gasoline plants and wellhead recovery units in the area.

The Cushing district is one of several Mid-Continent areas where expansion and modernization of field processing plants is resulting in an increasing amount of liquid products being "squeezed" from natural gas (PW—Apr.19'57,p35). Now the Texaco-Cities Service line is carrying such liquids to their best market—Chicago.

At East Chicago, some of the NGL is being used for refinery fuel, and some for product blending purposes.

The converted line is being run "tight" at high operating pressure to keep the commingled stream from flashing.

The stream is a highly volatile one, with a Reid vapor pressure of 40-50 psi. Consequently, the line's operating pressure is up around 750 psi.

The tight system means that no expensive pressurized storage is necessary anywhere along the 700-mi. line.

Texaco-Cities Service is somewhat of a trailblazer in piping the natural gas liquids a good distance without pressurized storage along the way. As far as is known, the converted line is the only one moving NGL in a pipeline without some specially-designed storage facilities.

The biggest job in converting the line, according to Texaco-Cities Service, was installing station piping and automatic shutdown devices.

The conversion, which cost Texaco-Cities Service in the neighborhood of $1.4-million, was made up of a number of "little" jobs.

The company is using most of the pumping equipment it used when the line was in crude service only. However, four pump stations on the line had to be reactivated, bringing the station total to ten. Two of the stations are diesel-powered and have reciprocating pumps; the other eight run on electric-powered centrifugal pumps.

Also, several crossovers and mainline extensions were necessary in the Chicago area to handle deliveries.

Only 10 mi. of new pipe had to be laid.

Additional pumping equipment will be used to move crude only through a 12-in. "twin" line, which parallels the converted line from Sheldon Junction, Mo., to East Chicago.

This "twin" originates in the Wichita (Kan.) area as a 10-incher. It can deliver up to 49,000 b/d of crude and can be used to move small amounts of natural gas liquids commingled in the crude.

The converted system has no automatic restart system, so power failures could result in some important problems.

A Texaco-Cities Service representative says that electric storms, which might knock out the purchased power for the electric pump stations, could be a "complicating factor" in the line's operation.

Since these stations have no automatic restart mechanisms, in the event of such failure they'd have to be restarted manually. That would probably mean a loss of several valuable hours in downtime.

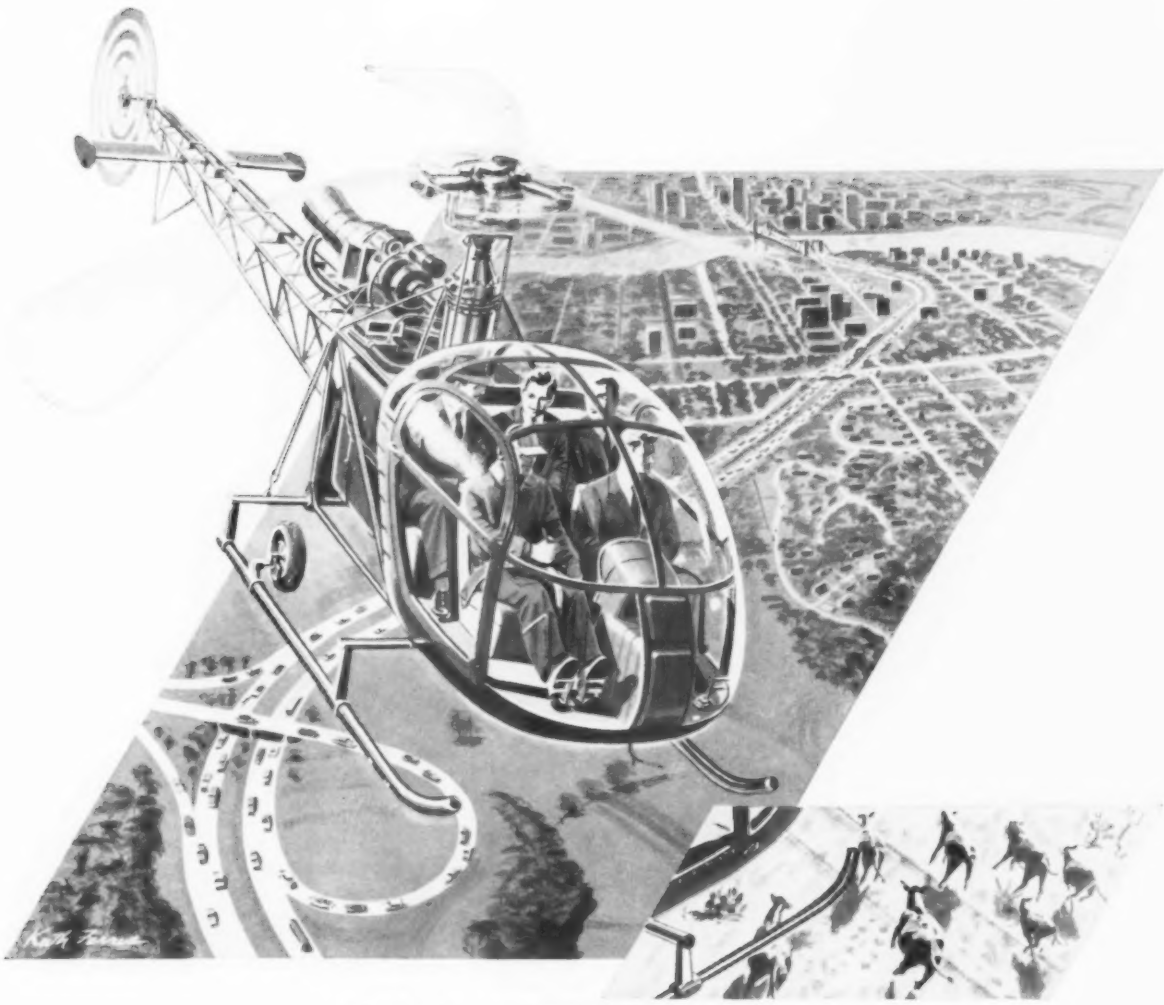
Products Line Competition Stiffens

There's growing debate in Florida over who is going to build the long-promised products line, which would initially carry jet fuel from Port Everglades to the Homestead Air Force Base. Such a line might eventually be used to supply the Miami market with a full range of products.

One of the two contestant companies, Florida Pipe Line Storage Co., took a step toward such a line earlier this month when it received a federal court approval of its plans to lease the right of way of Florida East Coast Railway between the two points.

Florida Pipe Line will pay $250,000 for leasing the right of way for five years, and has options for three additional five-year periods at the same rates.

Everglades Pipe Line Co., which announced plans to build a similar line last summer (PW—Jul.12'56, p15), now plans a line only half the distance to the Miami airport, with possible extension later to Homestead.



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The Alouette, designed by Sud Aviation, is the world's first production turbine-powered helicopter. Its almost unbelievable versatility makes it ideal for a broad range of operations heretofore considered outside helicopter capabilities. Republic Aviation Corporation . . . recognized for its alertness and foresight for more than a quarter century . . . is now selling . . . "tomorrow's design today"!

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HELICOPTER DIVISION

FARMINGDALE, LONG ISLAND, N. Y.

Know what this is?

It is the new T-C Gauge Valve and Connector which permits the operator to gauge dozens of wells with a single pressure gauge. Only the Gauge Valve element is installed permanently on the Christmas tree, and a single master gauge is carried from well to well to obtain the pressure reading. Instead of buying one or two pressure gauges for each tree, you buy just one master gauge for an entire field!

In a nut shell, here are the advantages:

Only one gauge to buy.
No breakage.
No gauge repairs.
No exposure to elements.
No inaccurate pressure readings.

To obtain well pressure reading, insert master gauge with Connector in Gauge Valve and turn gauge 45 degrees. Gauge Valve opens automatically, exposing gauge to pressure. Remove gauge and Gauge Valve closes automatically.

Ask any UNIBOLT man to demonstrate the Gauge Valve and Connector, or write:

THORNHILL-CRAVER CO.

P. O. Box 1184 Houston, Texas

What's New / IN TRANSPORTATION

Louisiana Hikes Right-of-Way Rates

In some recent horse trading, Louisiana got that healthy hike in right-of-way rates for state-owned lands, while pipeliners there avoided some pesty right-of-way restrictions.

Some 30-odd pipeline firms have entered into an agreement with the Louisiana Register of State Lands Office for the rate hike. By doing so, the companies won an indefinite postponement of the planned Mar. 6 meeting, which, in addition to hiking rates, would probably have imposed new limits on right-of-way privileges (PW—Feb.27'58,p37).

The most important of the proposed changes would have limited right-of-way tenure to 20 or 30 years. Tenure is now perpetual.

The rates were boosted from $2 to $3 per rod on land; and from $1 to $3 per rod on water bottoms.

•

Coal Line Ready Soon

The first coal pipeline is now said to be less than 90 days away from operation.

Pittsburgh Consolidation Coal Co. said last week that its 108-mi. line from Cadiz, Ohio to Cleveland will be operational by early June. The line has been a year late in getting into service.

Explaining the delay, a Pittsburgh representative said, "The pipeline itself and the related high-pressure pumping equipment have proved entirely successful from the start.

"Our problems have centered mainly around preparation of the slurry, with some difficulty in the drying operations."

•

Costs of relocating pipelines because of highway construction are becoming a more important issue.

United Gas Pipeline Co., for instance, has just been asked to pay for such a line relocation in Texas, and ordered to pay for another in Louisiana (the latter case is now in the courts).

The Louisiana case goes back to last year, when United went to court protesting the state's attempt to make it pay for a relocation made necessary by highway construction. A federal judge ruled in favor of United at that time.

Earlier this month, the decision was reversed by a U.S. Appeals Court in Shreveport. Indications are, however, that further court battles could change the relocation-costs picture in Louisiana again.

In Smith County, Texas, county officials have asked United to pay for a similar relocation because "it is not county policy to pay for such work."

•

The Federal Power Commission has approved one major expansion project of Southern Natural Gas Co. and is now reviewing the company's applications for an even greater project.

FPC approved Southern's plans to build 45.3 mi. of new laterals and 2,600 compressor hp. in its Louisiana supply system (PW—Feb.28'58,p38). The expansion would add 40.6-million cu. ft. of gas a day to Southern's supply. It would cost about $4-million.

Southern also has asked for FPC approval of a mammoth $64-million expansion program of its facilities throughout Mississippi, Alabama, Georgia, and South Carolina. The program calls for addition of 1,200 mi. of pipe, which would permit delivery of an additional 300-million cf/d.

•

Piggott Construction, Ltd., will build Alberta Gas Trunkline Co.'s 145-mi. line from Pincher Creek gas field, Alta., to Princess, Alta.

Piggott is now beginning work on the 24-in. line, and is expected to be finished by Sept. 1. At Princess, the line will hook up with the Trans-Canada system to eastern Canada and the U.S.

•

Colorado Interstate Gas Co. has offered to return about $24-million it collected from distributing companies from 1954 to 1957 on rates subsequently declared excessive by the Federal Power Commission.

The refund would be made to 14 distributing companies in Colorado western Wyoming, and then passed on to consumers there.

Denver mayor Will Nicholson, however, says the refund is not enough.

FPC recommended a $35-million refund.

HOW TO BE A HERO AT INCOME TAX TIME

(And save yourself a few dollars, too!)

FIND YOUR STATE TAX HERE!

Based on tax rates as of October 1, 1957 (in cents per gallon).

	State	Federal	Total
Alabama	7	3	10
Arizona	5	3	8
Arkansas	6.5	3	9.5
California	6	3	9
Colorado	6	3	9
Connecticut	6	3	9
Delaware	5	3	8
Dist. of Col.	6	3	9
Florida	7	3	10
Georgia	6.5	3	9.5
Idaho	6	3	9
Illinois	5	3	8
Indiana*	6*	3	9
Iowa	6	3	9
Kansas	5	3	8
Kentucky	7	3	10
Louisiana	7	3	10
Maine	7	3	10
Maryland	6	3	9
Massachusetts*	5.5*	3	8.5
Michigan	6	3	9
Minnesota	5	3	8
Mississippi	7	3	10
Missouri	3	3	6
Montana*	7*	3	10
Nebraska*	7*	3	10
Nevada	6	3	9
New Hampshire*	6*	3	9
New Jersey	4	3	7
New Mexico	6	3	9
New York (State)	4	3	7
N. Carolina	7	3	10
N. Dakota	6	3	9
Ohio	5	3	8
Oklahoma*	7.5*	3	10.5
Oregon	6	3	9
Pennsylvania*	5*	3	8
Rhode Island	4	3	7
S. Carolina	7	3	10
S. Dakota*	6*	3	9
Tennessee	7	3	10
Texas	5	3	8
Utah*	6*	3	9
Vermont*	6.5*	3	9.5
Virginia	6	3	9
Washington	6.5	3	9.5
W. Virginia	6	3	9
Wisconsin	6	3	9
Wyoming	5	3	8
U. S. Average	5.8	3	8.8

*Changes during year: Ind.—tax was 4¢ before 3/15/57; Mass.—tax was 5¢ before 6/1/57; Mont.—rate will be 6¢ effective 1/16/58; Neb.—rate was 6¢ before 9/20/57; N. H.—tax was 5¢ before 9/1/57; Okla.—rate which was increased on 6/1/57 dropped back to 6.5¢ by 12/31/57; Penn.—tax was 6¢ before 6/1/57; S. D.—tax was 5¢ before 7/1/57; Utah, tax was 5¢ before 5/14/57; Vt.—tax was 5.5¢ before 7/15/57.

STEP #1 **Just tell your friends** that their state gasoline taxes can be deducted on their Federal Income Tax. (Other taxes, such as state and local sales taxes, may also be deducted but under a different formula.)

STEP #2 **It's so easy.** You'll find your state gasoline tax on the tax list on this page. Multiply that by the number of gallons purchased in 1957.

STEP #3 **Here's an example:** Friend "A" drove 10,000 miles last year and got 14 miles per gallon. That's 700 gallons of gasoline. Say your state tax rate is 6¢ a gallon. 700 times 6¢ is $42. So friend "A" gets a $42 deduction on his Federal Income Tax. You're a hero! And you've made a friend for your industry!

You can make even more friends for your industry when you tell people that they drive a bargain with today's gasoline. The price of gasoline itself has gone up only 17% in the last decade while taxes have gone sky high. For every dollar they spend on fuel itself, they spend an additional 40¢ in federal and state taxes. Mail the coupon below for more information about today's gasoline.

American Petroleum Institute, Dept. G
50 W. 50th Street, New York 20, N. Y.

I would like to obtain more information about today's gasoline quality, prices and taxes. Please send me your FREE booklets.

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CITY _____ ZONE _____ STATE _____

DEPT / Marketing

U.S. Passenger Car Sales Potential—1958 Estimate

Commodity	Average Sale	Mileage Interval	% Cars	Consumption Factor Amount	Consumption Factor Mileage Interval	Total National Potential	Potential Per Car	Potential per 1,000 Gals. of Gasoline Sales Amount	% Gross Profit	Gross Profit Amount	Cents Per Gal.
Motor Oils-Lubricants											
Oil changes, additions (6 qts.)	$3.00	1,500	100	$3.00	1,500	$ 1,110,141,000					
Multi-luber lubricant	1.50	10,000	0.125	.002	10,000	111,014					
Gear oils (conventional) (5 pts.)	2.00	10,000	50	1.00	10,000	55,507,050					
TOTAL MOTOR OILS AND LUBES (Auto. Trans. Oil Incl. Below as Lub'n Serv.)						1,165,759,064	$21.74	$31.50	50%	$15.75	1.58¢
Lubrication Services											
Chassis lubrication	$1.50	1,000	100	$1.50	1,000	$ 832,605,750					
Master cylinder	.75	2,000	100	.75	2,000	208,151,438					
Air cleaner	1.00	3,000	100	1.00	3,000	185,023,500					
Wheel bearings—front	2.00	10,000	100	2.00	10,000	111,014,100					
rear	4.00	25,000	10	.40	25,000	8,881,128					
Auto transmission—fluid	7.80	20,000	50	3.90	20,000	108,238,748					
Power steering—fluid	.50	10,000	30	.15	10,000	8,326,058					
Other						144,521,857					
TOTAL LUBRICATION SERVICES						$ 1,606,762,579	$29.96	$43.42	90%	$39.08	3.91¢
Other Regular Services											
Battery recharging	$1.75	10,000	60	$1.05	10,000	$ 58,282,403					
Tire-tube repairs, switching, etc.	2.50	5,000	100	2.50	5,000	277,535,250					
Wheel balancing	6.00	5,000	40	2.40	5,000	266,433,840					
Car washing	1.75	1,500	75	1.31	1,500	484,761,570					
TOTAL OTHER REGULAR SERVICES						$ 1,087,013,063	$20.27	$29.38	95%	$27.91	2.79¢
*Percent of cars to which service applies											
New tires (replacements est. at 58,600,000 units @ $27.03 each)						$1,583,958,000	$29.53	$42.80	25%	$10.70	1.07¢
Retreaded tires (replacements est. at 28,532,500 units @ $13.00 each)						370,922,500	6.92	10.02	25%	2.51	.25¢
Tubes (replacements est. at 27,957,500 @ $4.18 each)						116,862,350	2.18	3.16	25%	.79	.08¢
Batteries (replacements est. at 27,250,000 @ $21.50 each)						585,875,000	10.92	15.83	30%	4.75	.48¢
Accessories (Necessary automotive)			**								
Spark plugs	$8.40	8,500	100	$8.40	8,500	$ 548,540,261					
Oil filters (cartridge and element)	3.25	5,000	90	2.93	5,000	325,271,313					
Shocks—pair—replace	19.00	25,000	80	15.20	25,000	337,482,864					
Lamp bulbs	1.25	12,000	100	1.25	12,000	57,819,844					
Radiator chemicals	1.25	12,000	100	1.25	12,000	57,819,844					
Radiator hose	2.00	20,000	100	2.00	20,000	55,507,050					
Belts—fan, power st., air cond.	3.50	20,000	100	3.50	20,000	97,137,338					
Wiper blades	2.00	12,000	100	2.00	12,000	92,511,750					
Air cleaner filter element (dry)	4.00	15,000	15	.60	15,000	22,202,820					
Others (incl. seat covers, mufflers, tail pipes, polishes, etc.)						1,161,577,534					
TOTAL AUTO ACCESSORIES						$ 2,755,870,618	$51.39	$74.47	30%	$22.34	2.23¢
**Percent of cars likely to buy											
Other Merchandise											
Thermostats, heater hose, antifreeze, tire chains, radios, spot lights, floor mats, sun glasses, seat cushions, replacement parts, small electrical appliances, home specialties, etc.				$15.00 per car per year		804,450,000	15.00	21.74	30%	6.52	.65¢
GRAND TOTALS						$10,077,473,174	$187.91	$272.32	48%	$130.35	13.04¢

This is Shell Oil Co.'s estimate of POTENTIAL in 1958. Because not all of this business will go through service stations, it should not be construed as an estimate of actual service station sales.

TBA Sales Potential Climbs Again

This year's national passenger car sales potential is up 5.9% for tires and 9.5% for batteries, according to Shell Oil Co.'s 1958 estimate of sales potential for lubrication, labor services, tires, batteries, and the most common automotive accessories.

Shell's estimates indicate potential only—the good and services that would be purchased if a motorist were to buy what he needs when he needs it. These estimates do not purport to represent a forecast of actual retail sales.

Underlying Shell's estimates are three basic factors: In 1958 it is estimated (1) that there will be 53,630,000 passenger cars in use; (2) that they will consume an average of 690 gal. of gasoline each; and (3) that they will travel a total of 555,070,500,000 mi.—based on average mileage of 15 mi. per gal.

The total passenger car sales potential for goods and services available at service stations is estimated at more than $10-billion for 1958—

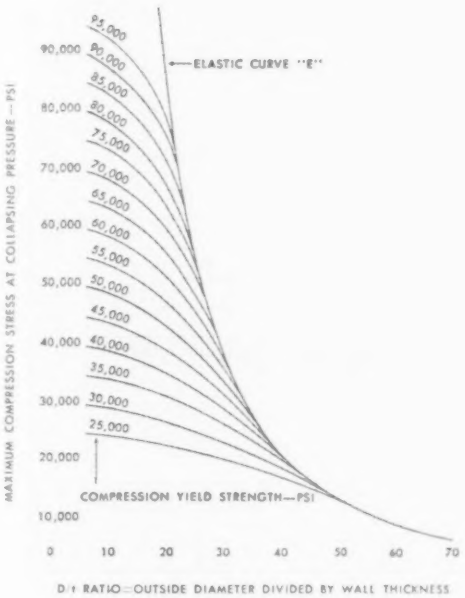
For high collapse strength . . . A.O.Smith CORPORATION

S-95 CASING

The development of A. O. Smith S-95 casing, designed for deep wells, stems from the combination of basic research, continuing applied research, and a unique fabricating method.

By a mechanical cold-working process, A. O. Smith S-95 casing achieves a high degree of compression yield strength which results in a corresponding increase in actual collapse strength of the casing.

BASIC RESEARCH — The Jasper curves for collapse stress, shown on the right, are the basis for the published minimum collapse values for A. O. Smith casing.



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CORPORATION
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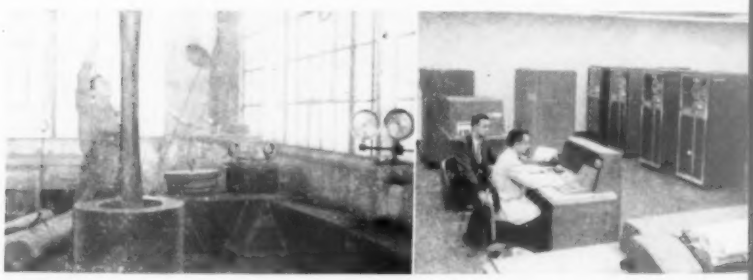
A. O. Smith International S. A., Milwaukee 1, Wisconsin, U. S. A.



APPLIED RESEARCH — The above photo shows a specimen being removed after collapsing during the original test program to establish the Jasper curve. A continuous collapse testing program still confirms the data originally developed.

DESIGN — A. O. Smith uses its electronic computer as a modern tool in establishing sound and accurate casing string design.

Turn page to see . . .

. . . HOW WE WORK STEEL TO MAKE STEEL WORK FOR YOU

about $1¼-billion higher than the 1957 potential which was estimated at $8.8-billion.

The biggest jump apparently is an increased potential for sales of necessary automotive accessories. This climbed from $2.15-billion in 1957 to $2.75-billion in 1958, an increase of $600-million.

The estimated potential for tire and tube sales climbed from $92.2-million in 1957 to $116.8-million in 1958.

The estimate of per-car potential climbed from $169.69 in 1957 to $187.91 this year.

A big slice of this increase is reflected in the increased potential for accessory sales—up from $41.30 to $51.39 per car.

The only per-car estimate that is down is the potential for total lubrication services, which dropped from $30.31 in 1957 to $29.96 this year.

The estimate of the total potential of lube services is higher than in 1957, however, because of the increase in the number of passenger cars expected to be in use.

This is the tenth consecutive year that Shell's estimates of TBA potential have increased. In 1957, the total potential was estimated at about 6.7% above the 1956 estimate.

What's New / IN MARKETING

Heating oil marketers have a new aid in degree-day forecasting that will help them in assessing fuel demand in advance.

A two-volume "Handbook of Degree-Day Data for the U.S." has been published by the American Petroleum Institute's department of technical services.

Vol. I presents a statistical summary of degree-day information for 171 weather bureau stations throughout the U.S.

Vol. II contains detailed data for various locations, as recorded by the U.S. Weather Bureau. It is the basis for the summary tabulations in Vol. I.

The preface says the handbook "presents the normal degree days for the entire heating season and for the remainder of the season starting from any month within the season. An important new contribution is the presentation of degree days, both colder and warmer than normal, with specified probabilities."

Copies of the handbook are available through API, 50 W. 50th St., New York 20, at $7 per volume. Members' price is $4.20 per volume.

•

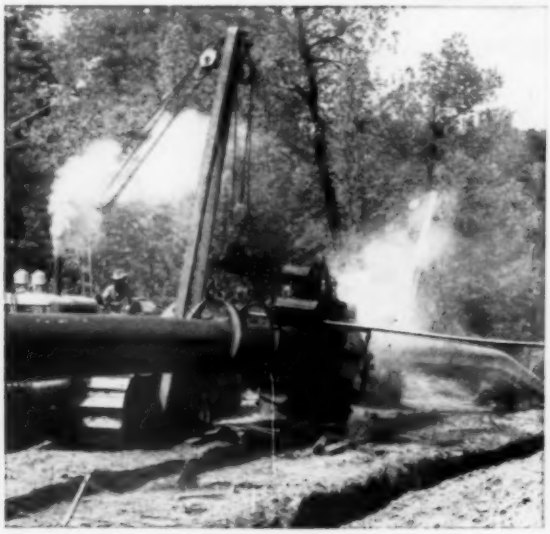
Husky Oil Co. has put its refining operations, its marketing of asphalt and other heavy-end products, and all related service functions under the direction of H. Earl Clack, Inc., renamed Husky Hi-Power, Inc. The firm is Husky's wholly-owned light-ends marketing subsidiary.

A spokesman for Husky says the expansion of the subsidiary is "designed to secure better integration of refining and marketing operations." No change is to be made in the subsidiary's board, and the company's headquarters will continue to be in Cody, Wyo.

•

The dealer-backed bill to increase state controls on gasoline pricing in Michigan (PW—Jan.31'57,p46) has

A. O. Smith products for



A. O. Smith line pipe has always been manufactured to a high standard of quality for almost 30 years . . . precisely controlled at every step of production. That's why A. O. Smith pipe, made and installed in 1928, is still in operation. That's why so much A. O. Smith pipe is in nearly every important high-pressure line.

Wherever crude or petroleum products are on the move, A. O. Smith meters of exclusive rotary positive displacement design can perform as perfect auditors because they feature accounting machine accuracy. Thus they eliminate costly capital investment in storage facilities and save transfer time and manpower.

HOW WE WORK STEEL TO MAKE STEEL WORK FOR YOU . . .

been sent to the State Senate's Judiciary Committee. In effect, this kills chances for passage this year.

The senate voted 15 to 13 to refer the "business practices" bill to the committee, after a 90-minute debate. The vote was split about equally between Republicans and Democrats.

•

A "Truth Crusade" was launched last week by the National Congress of Petroleum Retailers to "talk up" the group's accomplishments and objectives at 35 dealer-group meetings in 31 states. The program will take John W. Nerlinger, Jr., executive secretary, on a 24-day, 6,000-mi. tour through midwestern, Rocky Mountain, and Pacific states. It will take Cash B. Hawley, president, on a 28-day tour of eastern and southern states.

•

Gasoline jobbers, dealers, consignees, and other small businessmen forced to move because of new highway construction may get low-interest "disaster loans."

A bill was introduced in the Senate last week to provide such assistance (repayable at 3% interest within ten years) either directly from the Small Business Administration or from private institutions through SBA.

The bill's sponsor, Sen. Hubert H. Humphrey (D., Minn.) says "as many as 50,000 American businesses may be forced out of their current sites in the next few years because of the tremendous amount of urban redevelopment and highway construction."

•

Sales of gasoline and other products at service stations amounted to $1,209,000,000 in January, down from December, but higher than January, 1957. Comparable sales figure for December was $1,286,000,000; for January, 1957, $2,137,000,000. The figures are reported by the U.S. Census Bureau.

•

Ohio Oil Co. has launched a huge advertising campaign to push its "Smile-Maker" program, offering money-back guarantees on products and services bought at service stations.

The "Smile-Maker" campaign was launched last fall in an effort to boost station sales.

One of the biggest ad campaigns in the company's history began Feb. 25 with large-size newspaper ads in 72 papers throughout the marketing area. Spot radio announcements and year-round outdoor advertising are also a part of the drive. The theme—"Smile-Maker Service or your money back"—is also tied into promotion and driveway merchandising.

If a customer is dissatisfied with the "Smile-Maker Service" he merely presents proof of purchase within 60 days and he gets his money back.

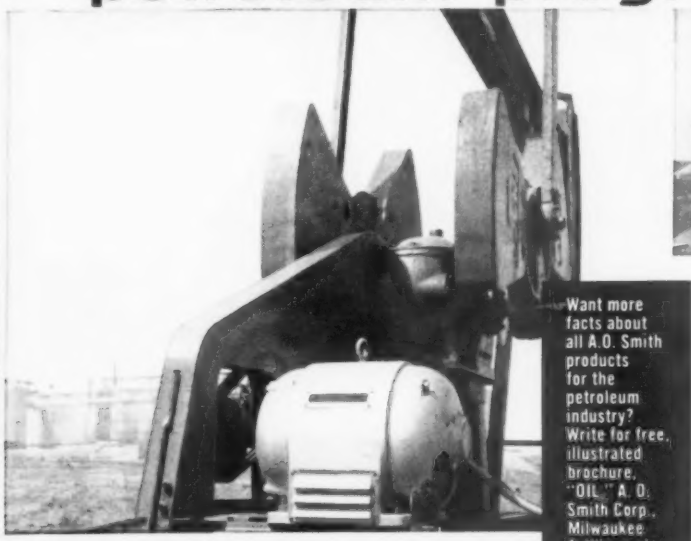
•

American Oil Co. will revamp its credit card system June 1—using electronic scanning equipment to speed accounting procedures throughout its 26-state marketing area.

Amoco will use the "Scandex," manufactured by Farrington Mfg. Co. The machine has been used experimentally by Standard Oil Co. of California in its credit card operations (PW—Nov.1'57,p50).

The Scandex transmits pulse patterns—set up by light beams that "scan" the credit-card invoice—to an "interpreter," or small-scale computer, where the numeral or character is stored. It is used in conjunction with punch-card equipment.

petroleum progress



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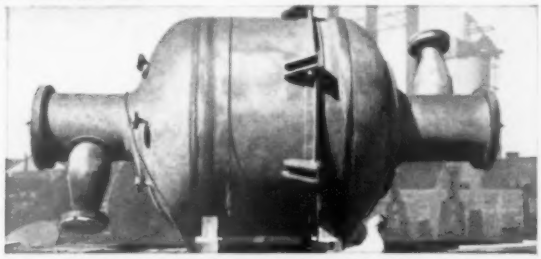

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ON SUN OIL'S SECOND JACKPOT WELL, the SVS-X-4, two Texans, Charles A. Hornberger (left), from San Antonio, and Elvin Fountain, from Texarkana, agree that work conditions in Lake Maracaibo are better than in the U.S. Gulf.

'Blue Chip' Game Is Paying Off for In

(Tenth in a series of on-the-spot Venezuelan reports)

MARACAIBO—Wildcatting for oil in Lake Maracaibo is a "deluxe" operation today.

With big city facilities at Maracaibo, luxury hotels, an increasing variety of oil field supply and service companies, and easy (though expensive) water transportation to drill sites, work conditions are relatively good compared to exploration in most other areas in Venezuela.

This is the concensus of independent American oil men down here—and there are more Texans (plus a sprinkling of Oklahomans and Californians) per square foot at Maracaibo's ritzy Hotel del Lago than any place this side of Houston.

"It's clean work here," says J. B. Turner, of Beaumont, Sun Oil Co.'s Maracaibo district manager. "There's no mud, not much rain, and no danger of hurricanes. It's certainly easier work than offshore Texas or Louisiana."

Drilling is shallower than in the Gulf of Mexico, and the sheltered lake waters do not require as large or as costly drilling platforms. Lake platforms run about 8 to 24 ft. above the water, as against 35 ft. and more in the Gulf of Mexico. (Foundation costs vary considerably, however, from about $35,000 to $100,000 for Creole, which operates in shallow water and has large-scale facilities for building its own units, to $200,000 to $240,000 for the newcomers out in the deeper part of the Lake who use contractors.)

But one thing is clear: Wildcatting in Lake Maracaibo is also a blue chip game. It's not for the timid or light of pocket.

Witness Superior Oil Co. The company plunked down something between $30- and $40-million before spudding in its first wildcat. It paid a $22-million bonus for its 7,700-acre fishing rights in the middle of the Lake, spent another $4-million on a warehousing and docking terminal, plus additional millions in preliminary seismic work before starting its first test.

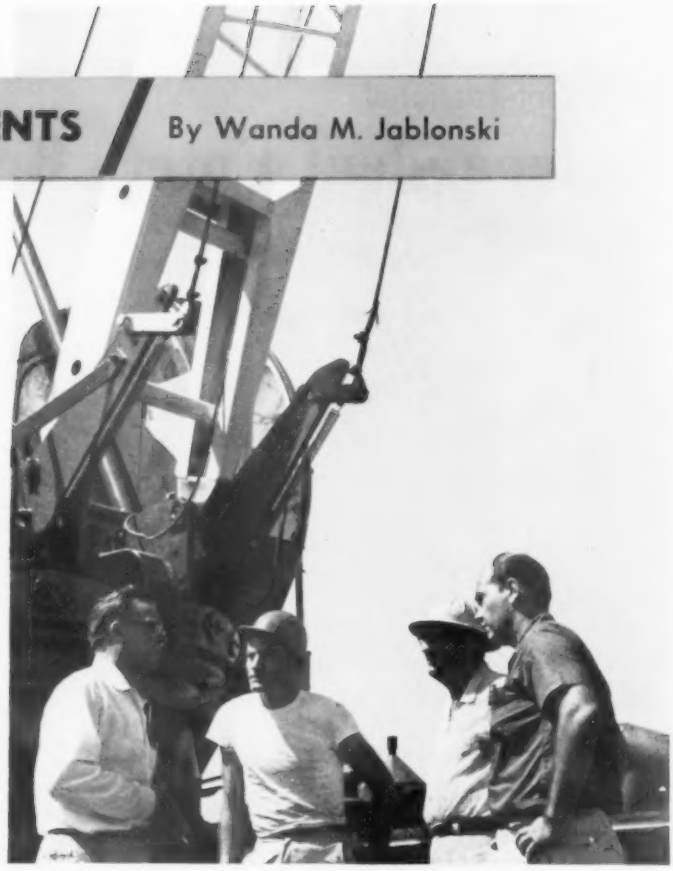
The other newcomers spent less (the San Jacinto group, for example, $10-million so far)—but not peanuts in any case.

* * * *

And the exploratory tests aren't cheap. The first couple of wildcats cost a cool $1-million apiece. The cost of Superior's wells in 90 ft. of water now range an estimated $750,000 to $1-million. Sun's estimates run about the same. San Jacinto's discovery well cost "over $1.5-million," according to R. E. Storms, the company's vice-president and manager in Maracaibo—but this included a month's delay because of a fishing job.

Other costs are high, too. Sun's Turner estimates that materials cost a good 25% to 30% more than in the States, local labor half again as much, and the cost of American

COMMUTERS, MARACAIBO-STYLE: Superior Oil group arrives at work after 1¾-hour launch trip.



AT SUPERIOR'S LAMA-7, J. W. Lee, Loffland Bros. (second from right), talks with Superior's R. L. Lott, H. T. Morrow, and Murray Warren.

Independents in Lake Maracaibo

staff about twice as much as in the States (due to high living cost here, plus extra foreign service pay, and the costs of paid vacations back home).

Other companies agree with Turner's estimates. Storms, who joined San Jacinto after 20 years in Venezuela with Mene Grande Oil Co. (but who goes home to San Antonio every two years to renew his "Texas citizenship"), also stresses the high cost of water transportation. His men have to commute to work 66 mi. by boat or helicopter.

"When you start paying those bills," he says, "that distance begins to eat on you."

* * * *

But while this is a blue chip game, it's a game in which the chips are paying off handsomely so far. As is well known, all the newcomers that acquired Lake concessions in the recent Venezuelan bids have already struck oil. This includes Superior, the San Jacinto group, the Sun-Atlantic-Seaboard group, the Phillips group, and the Signal-Pure-Sohio-Hancock group.

And even if costs are a good deal higher than in the States, there's no doubt that the pay-out is a good deal better here—assuming you have markets—because of the larger potentials of the discoveries and the absence of proration.

The story of Superior's five prolific producers—with spectacular net pay sands of 1,000 ft. of Eocene in its Lama No. 7 well, and discovered reserves already estimated at nearly 2-billion bbl.—is too well known to need repeating.

Take, however, the Sun group's first wildcat: the SVS-X-1, which was taken to 13,700 ft. and found oil in the Cretaceous at 11,050-70 ft. It tested 500 b/d. Yet it was not even rated as a commercial producer.

"This well is too small to count here," points out J. D. Taylor, Sun geologist from Midland, Tex. "Yet it's bigger than the maximum allowable for most wells in Texas."

The Sun group subsequently hit a real jackpot, on its third try. A diagonal offset to Superior's spectacular Lama 7, the Sun SVS-X-3, hit 911 ft. of net pay of Eocene between 8,210 and 9,700 ft. It tested over 7,000 b/d, as did the next producer, SVS-X-4 (picture).

"We never found anything like it at home," says one company official.

There's an ironical twist to the wheel of fortune in Sun's story. Back in 1920s, the company drilled several dry holes southeast of Lake Maracaibo, and finally pulled out in disgust.

"In a way," cracks L. J. Davignon, from Sun's Dallas office, "you might say it took us 30 years to get a pay-out here."

Independent Enters British Honduras

Los Angeles independents are now entering the oil hunt in British Honduras, where Shell recently joined Gulf's wildcatting operations.

Bandini Petroleum Co. has formed Belize Petroleum Co., Ltd., as a wholly owned subsidiary to explore new oil rights covering more than 2-million acres in the southern half of the British colony in Central America.

Out of the total, Bandini was granted 958,624 acres on its own. It holds another 908,173 acres under a working agreement with another Los Angeles independent new to the scene —West Caribbean Oil Co., headed by A. P. Quirk. In addition, Bandini will acquire a further 144,615 acres under a working agreement with Gulf.

Bandini Petroleum is now preparing to drill a wildcat by the end of the year. It's the company's first foreign drilling venture.

Bandini, a California producer since 1921, also holds acreage in neighboring Guatemala (PW—Jul.12 '57,p35), but no exploratory drilling has yet been started there.

When the rainy season draws to a close in mid-September, the company hopes to be ready to move in a contract rig for its first British Honduras test. Photogeologic studies were recently completed by Geophoto Service, Denver, and more detailed field work is now being carried out. A fair share of the reconnaissance will be done by helicopter.

According to Bandini president William L. Boyer, photo and field information indicate there are from eight to ten prominent structures on its acreage.

Three structures have been singled out for possible drilling. The Punta Gorda anticline will probably be first. The anticline (closest to shore, map) is believed to be between 5 and 6 mi. long and 3 mi. wide, trending in an east-west arc. Though located in jungle country, it has been used for grazing land, and is fairly clear. It is also served by an all-weather road—an important consideration in British Honduras wildcatting.

Bandini's prime target will be the Lower Cretaceous. The company anticipates going to about 7,500 ft.

But the Punta Gorda anticline also has Eocene rocks in its core, and seems to offer "more section to play with," according to E. A. Gribi, Jr., company geologist and board member.

The two other anticlines that figure in early plans are the Big Fall, about the same size as Punta Gorda (farthest north, map), and the Otoxha, both trending northeast-southwest. The latter, Gribi reports, looks like the biggest yet found in the concession areas. It partly overlaps a Guatemalan concession held by Signal Oil & Gas Co., and appears to be more than 10 mi. long and 5 mi. wide.

Bandini may use air drilling on its projected test to avoid circulation difficulties, which have been a problem in the few wells drilled to date in the colony, mainly in the Cretaceous.

A new spurt in British Honduras drilling activity was kicked off last fall by Gulf Oil Corp., as Shell acquired a 50% working interest in its northern operations (PW—Nov.8'57, p39).

In 1956, Gulf drilled and abandoned British Honduras' first two tests. Both were relatively deep.

For several years, Gulf was sole holder of 31 exploratory licenses, covering the whole colony. In October, 1957, Gulf was given a one-year extension on 18 licenses covering the northern half of the country, about 5,000 sq. mi.

In the south, Gulf gave up all but about 800 sq. mi., some 140,000 acres of which will now be shared in a checkerboard pattern with Bandini.

The only land not covered by oil licenses now is the Maya Mountain area.

So far, a "pint of oil"—literally—

has been found in the colony, in Gulf's Roaring Creek wildcat, which was abandoned at 3,683 ft. after this first "oil find" had stirred considerable excitement and interest (PW—Dec. 27'57,p32).

Two subsequent tests in the north have also been abandoned, the No. 1 Retaliation, at 3,800 ft., and the No. 1 Tower Hill, at 7,298 ft.

Gulf is now getting under way with two new wildcats for its joint account with Shell. The No. 1 Sand Hill has been spudded about 20 mi. northeast of No. 1 Retaliation, while a site is being prepared about 27 mi. southwest of No. 1 Tower Hill for No. 1 Blue Creek, the seventh test in the colony.

Gulf will continue to operate two strings of tools in the north this year, with Kerr-McGee furnishing rigs for the program.

These companies are not overlooking offshore prospects, which could conceivably be cheaper than land work, considering jungle vegetation and lack of roads.

There is a 200-mi. barrier reef, about 20 mi. offshore. It is said to be second in size only to Australia's Great Barrier Reef.

Water depth inside the reef averages 30 to 50 ft., ranging to a maximum of 120 ft.

An oil discovery would prove a boon to British Honduras' economy, which has depended on lumber, chicle, coconuts, and bananas since the early 1600s.

The colony supports about 78,000 people, who speak five separate languages—Spanish, English, Maya, Carib, and Creole.

Life in the jungle villages and small towns along the green, tropical rivers is said to be much the same as it was 200 years ago.

Big New Kuwait Field to Flow in 1959

KUWAIT—Kuwait Oil Co. will start production in northern Kuwait next year at its new Raudatain field. It expects to have 20 wells completed, averaging 5,000-7,000 b/d apiece (PW—May3'57,p21).

By late 1959 or early 1960, KOC will bring Raudhatain output to 200,000 b/d, according to present plans.

This was disclosed here last week by a production official of the company, which is owned jointly by Gulf Oil Corp. and British Petroleum Co.

KOC is currently on its eighth, ninth, and tenth wells at Raudhatain, with two contract rigs at work and one small rig on subsequent testing.

The wells have found production at levels around 8,500 ft., deeper than the 4,800 ft. production at Burgan, in southern Kuwait.

The original Raudhatain discovery well found 1,500 ft. of net pay—thicker than in Burgan, which is considered the world's largest single oil pool. (Company estimates place its proved reserves at 40-million bbl., more than the entire United States.)

Testing has not yet been completed on any of the wells, though the first seven are described as "very encouraging."

"We know Raudhatain is a good field. It's no doubt smaller than Burgan—but we still haven't found its boundaries," the KOC official said.

The company expects it may take another four months to outline the field. It is now investigating areas west and southwest of the proved area.

KOC is also preparing to start a second wildcat in the Sabriya area, 9 mi. southeast of Raudhatain.

There is still a question whether sustained production is possible in the No. 1 Sabriya, which was carried to 8,500 ft. with "fair results." At this point, the company believes the well may have been unfavorably located on a structure that is probably separate from that at Raudhatain.

The No. 2 well will be started in a month at a site due north of No. 1, and due east of Raudhatain.

Results have been discouraging at two other locations in northern Kuwait.

The company has no plans to develop the Bahra area, where a test drilled over a year ago, some 20 mi. southeast of Raudhatain, had doubtful commercial possibilities.

A single wildcat drilled at Mutriba, 50 mi. southwest of Raudhatain, was dry.

Work has already been started on the projected 30-in. pipeline outlet for Raudhatain production (PW—Jan.31'58,p50).

At present, about 4 mi. of pipe have been laid to Magwa from the North Pier at the Mina al-Ahmadi loading port. The company is now surveying the route north to Raudhatain.

The question now is whether to run the pipeline under the southwest corner of Kuwait Bay or to go around it.

The development push in northern Kuwait is part of a huge program to boost production and export capacity.

If oil demand justifies the increase, the company plans to step up its current 1.3-million b/d crude output to a possible 1.7-million b/d after one year. This would include added production from southern Kuwait. The company now has three rigs drilling there, plus one on workovers.

And this year, loading capacity at the Mina al-Ahmadi oil port will be boosted by 1-million b/d, to a maximum 2½-million b/d, with completion of a new pier in December.

Kuwait is now officially in the product exporting business, following last week's dedication of new facilities that jump total refining capacity to 190,000 b/d (PW—Oct.25'57,p51).

KOC previously had only a 50,000 b/d plant. The new installations added include two 80,000 b/d atmospheric distillation units, each with a gasoline stabilizer, and tankage for 2½-million bbl. of crude and products.

The Sheikh of Kuwait and more than 1,000 oil company officials and Kuwaitis attended the formal dedication ceremonies.

The new plant is already operating at 60% of total capacity.

Crude runs will be brought up to full refining capacity when world oil demand improves, KOC's managing director, C.A.P. Southwell, told PETROLEUM WEEK.

"This depends a lot on what happens in America, of course," he added. "The market is depressed now, but we must think in long-range terms."

Creation of the new facilities, Southwell said, was a "logical development" to meet local needs, feed bunker requirements, and "participate in the growing European market for refined products."

About 60% of refinery output will be available for export, with shipments of fuel oil to Europe as the main objective.

Fuel oils account for 50-60% of the refinery output, middle distillates 10-20%, and gasoline and naphtha 20-25%. About 30% of production will go to bunkers, and 10% will be for local consumption. Products in the gasoline range that cannot be exported will be re-injected into the ground to maintain oilfield pressure.

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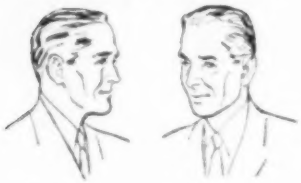

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What's New / AROUND THE WORLD

New Sahara Bids Due

SAHARA—Applications will be due by Apr. 12 for new oil rights in the southern Sahara—including areas around the oil finds near Libya (PW—Mar.14'58,p50).

The acreage, totaling more than 46,000 sq. mi., will become available for redistribution by the French government at the end of May on expiration of 11 permits held by two Shell affiliates.

CREPS (35% Shell) and Cie. des Petroles d'Algerie (65% Shell) may request renewal on half of the acreage they now hold. CREPS thus must surrender at lease 28,000 sq. mi., including southeastern acreage near the Libya border, where it found the Edjele and Tiguentourine fields and made the recent Zarzaitine oil strike, and southwestern areas around and in Salah, where gas traces have been found. Just north of the latter CREPS areas, CPA will be giving up almost 17,800 sq. mi. of its acreage.

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BAHAMAS—A $3-million offshore wildcat, one of the costliest ever budgeted in oil industry history, will be spudded jointly by Gulf Oil and California Standard in April.

According to an announcement this week, the test will be carried to a maximum of 15,000 ft. on Cay Sal Bank, about 180 mi. southwest of Nassau.

Zapata Off-Shore Co., of Houston, will drill the test with a Scorpion rig from a self-contained platform located in 30 ft. of water.

The wildcat will be the first on 12 joint prospecting licenses covering 1.9-million sq. mi., held by Bahamas Gulf Oil Co. and Bahama California Oil Co., wholly-owned subsidiaries of the two majors. No plans are indicated for additional tests.

The drill site was selected after two years of marine seismic work covering 1,700 sq. mi.

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FRANCE—Oil importers have been given four months to increase their present oil stocks by about 1-million tons under a new government decree last week.

The decree requires importers to maintain stocks at 25% of their previous year's distribution at all times.

It covers all fuel oils, gas oil, and all gasolines except avgas. But importers were authorized to substitute a proportion of crude in building up their stock levels.

Industry sources estimate that new storage installations plus the added stocks will cost over $70-million. This cost is apparently to be borne by the industry itself. An OEEC Oil Committee working group that has been studying the problem had recommended recently that member governments pay the bill for increased oil storage and stockpiling.

•

GERMANY—Oil product prices are being slashed by newcomers in the stiffening competition for a share in West Germany's thriving oil market.

Underbidding by companies that have only recently entered the German market, plus new competition profiting from lowered freight rates, are taking a several-million-dollar bite out of the big established companies' markets.

The sharpest price cutting has been on fuel oils, even though demand has been surging ahead.

In the first two months of this year, consumption of heavy fuel oil was up 77% and light fuel oil up 35% over the same period last year, when consumption was somewhat depressed by the Suez crisis.

By last week, light fuel oil was being offered in Hamburg at $24.80 per ton.

At the same time, prices for heavy fuel oil, c.i.f. Hamburg, dropped from $19-$20 a ton in January to $16-$17 for immediate spot delivery. Prices for longer-term delivery dropped from $21 in January to $17-18. This is considerably lower than the cost of domestic and imported U.S. coal.

Discounts up to 66% are also being offered in direct sales of gasoline to independent filling stations, wholesalers, and large consumers.

Newcomers who do not have extensive networks of filling stations are offering gasoline at 11¢-19¢ off the standard prices. Including 29¢ in fiscal charges, the standard price for regular grade is 56¢-61¢, depending on the distance from the coast.

Considerable amounts of cheaper gasoline are also being offered from Italy, Austria, Rumania, and East Germany.

So far, the big marketers have not dropped prices at company-owned filling stations.

•

COLOMBIA — A New Orleans group, latest to enter Colombia, is starting geophysical work on a recently acquired 25,000-acre concession in the Magdalena Valley.

The concession was transferred to Vasser, Walker & Labouisse by Dallas petroleum consultant Victor Oppenheim. The acreage is located east of Barranquilla, near the Caribbean Coast.

Oppenheim, who retains an interest in the tract, also recently transferred a 40,000-acre Sinu Basin concession to Ambassador Oil Corp., of Fort Worth (PW—Jan.17'58,p60). The latter company, Oppenheim said, is now engaged in reviving old production on the grant.

•

JAPAN—A decision is due next week on a possible 50% government subsidy for imports of 100,000 tons of crude from the Soviet Union to replace dollar and sterling oil.

The Ministry of International Trade & Industry would like to buy the oil in order to balance its trade surplus with the Soviet Union. The problem is complicated by the fact that the Baku oil offered by the Russians is priced at least 10% higher than Persian Gulf crude.

Japanese refiners are asking for the 50% government subsidy to cover not only the higher cost, but also the imponderables of handling crude on which specifications have not been made available.

The government had originally put an allocation for Russian oil into its foreign exchange budget for 1958, after signing a trade agreement with the Soviet Union last December. No time limit was set, however, on when the 100,000 tons would be delivered.

Japanese refiners balked at the prospect that the requested 50% subsidy would be taken out of the foreign exchange allocation for oil. They pointed out that this would create difficulties for the entire industry, particularly since there is already pressure to cut oil imports this year. MITI officials are now trying to find another pocket from which to take the subsidy.

Meanwhile, there is also growing government pressure on refiners to switch more of their crude purchases from dollar to sterling oil, due to a large sterling trade surplus.

Refiners are now hoping to repeat their 1956 performance, when they used a similar payments situation to buy sterling oil and save badly needed dollars.

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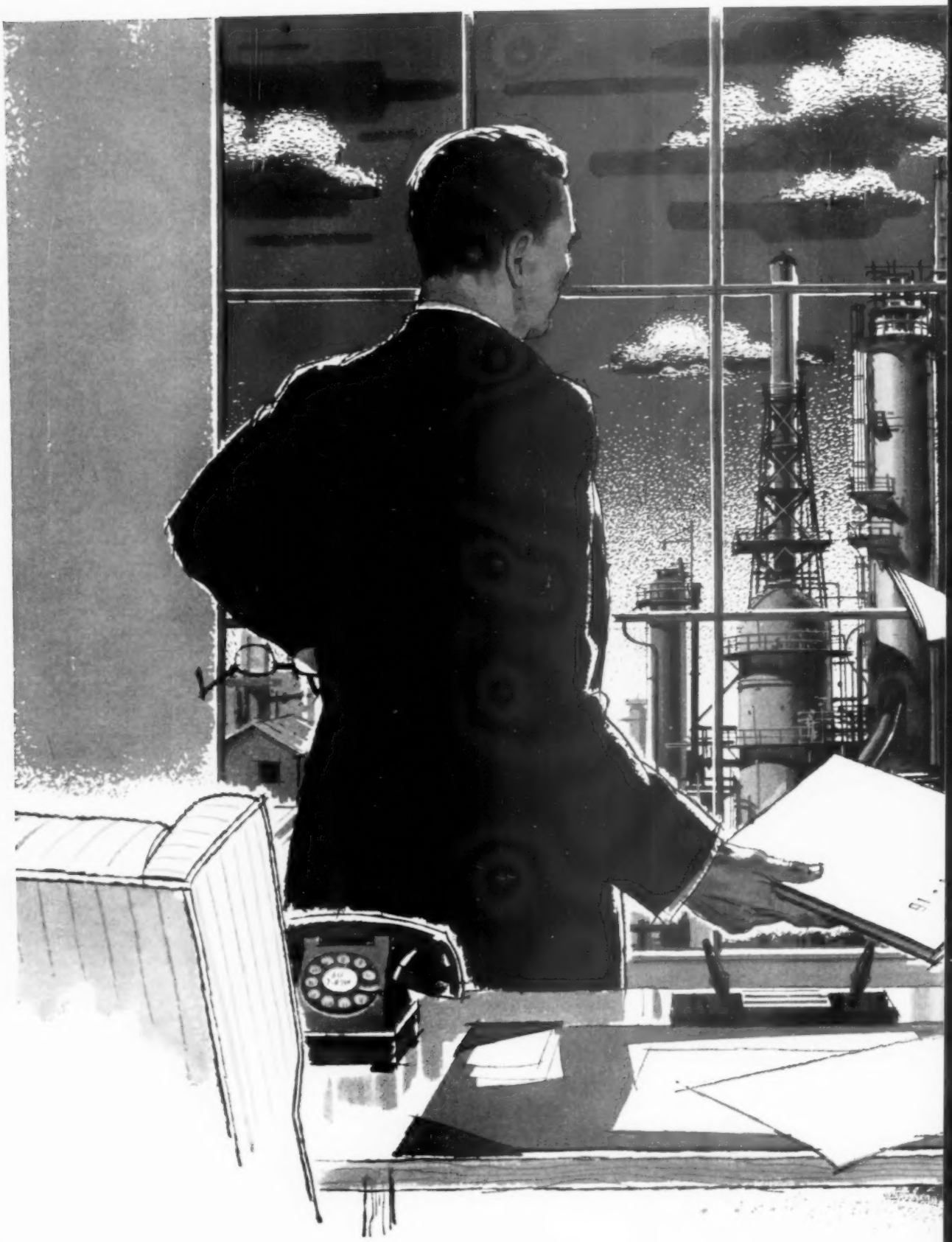

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SHELL DEVELOPMENT CO., has set up a new exploration and production research division, consolidating a former division of the same name with Shell Oil Co.'s technical services division, both in Houston. The new organization will consist of four main groups, with **W. R. PURCELL** as director of basic research, **J. E. WILSON** as director of exploration research, **B. P. EASTIN** as director of production research, and **F. GOLDSTONE** as manager of administration and services. Shell Development vice-president **Dr. Noyes D. Smith, Jr.**, will head the organization. Purcell is currently manager of the exploration and production research division's chemical department, Wilson is exploration manager for Shell Oil's Denver area, Eastin is production manager for the Pacific Coast area, and Goldstone is manager of exploration technical services, in Houston.

BEN F. UHL, JR., is the new president of Conorada Petroleum Corp., New York, replacing **C. F. Dohm.** Dohm resigned to become president of the newly formed Pan American International Oil Co. Uhl has been vice-president of Conorada since January, 1955. Other newly appointed executives include **W. F. Penniman, Jr.**, as vice-president in charge of government relations and negotiations, and **C. G. Flittie** as vice-president in charge of exploration. Penniman, former foreign representative in Paris, will remain there. Flittie, with Conorada since March, 1957, in the production department, was formerly with Arabian American Oil Co., Dhahran, Saudi Arabia.

J. L. ZUST will replace **C. A. Willis** as general sales manager of Cities Service Oil Co. (Del.) in Chicago. **R. L. Isselhardt**, formerly Chicago assistant regional manager, succeeds **B. J. Farwig** as wholesale manager, and **H. F. Goold** replaces **Charles Self** as Chicago regional manager. Willis, Farwig, and Self have retired. Succeeding Zust as St. Paul regional manager is **P. R. Shay**, who in turn, is replaced by **R. R. Chastain** as Kansas City regional manager. **C. W. Stark** will take over Goold's former post as Cleveland regional manager.

ALFRED G. LEWIS has joined Star Falcon Oil Co. as manager of operations in Arkansas, Louisiana, and Texas. Lewis, whose previous oil experience has been with Standard Oil Co. (N.J.) affiliates, will make his headquarters in Dallas.

CHARLES CLARK, the oil industry's most active "brainstorming" specialist, is leaving Ethyl Corp. to start his own firm in New York City. The new company is Creative Thinking Courses, Inc., through which Clark will offer demonstrations and workshops in creative thinking, including brainstorming. In the past 4½ years with Ethyl, Clark has made appearances at many oil companies.

A. C. INGERSOLL, JR., president of Federal Barge Lines, St. Louis, Mo., has been elected board chairman of American Waterways Operators, Inc., national association of the barge and towing vessel industry. He succeeds **V. A. Kogge**, transportation manager of Marquette Cement Mfg. Co., Chicago.

PAUL WEAVER has been awarded the Sidney Powers Memorial Medal in recognition of his outstanding contributions to and achievements in petroleum geology. The presentation was made last week at the 43rd annual meeting of the American Assn. of Petroleum Geologists in Los Angeles. Weaver, technical assistant to the vice-president of Gulf Oil Corp. until his retirement in 1953, now is professor of geology at Texas A&M College. The AAPG President's Award was given this year to **John C. Ludwick, Jr.**, sedimentologist, Gulf Research & Development Co., Harmarville, Pa., and **William R. Walton**, geologist, Pan American Petroleum Corp., Tulsa. It is given to an author or authors, whose article in the association's bulletin is considered the most significant contribution to petroleum geology.

JACK BAKER will manage Kern County Land Co.'s new offices in Albuquerque, N. M., opened to handle operations in the Four Corners area. Baker, a geologist, formerly was with Skelly Oil Co.

BEN D. GOULD has been named chief petroleum engineer and production superintendent for Reiter-Foster Oil Corp., Dallas. He was formerly petroleum engineer for American Petrofina Co. of Texas.

KERMIT ROOSEVELT has been named by Gulf Oil Corp. as its director of governmental relations. From his Washington office, he will maintain liaison between the company and governmental agencies in the U. S. and other countries in which Gulf does business. Grandson of former President Theodore Roosevelt, he is a former consultant to the Secretary of State on Middle Eastern affairs and author of a book, "Arabs, Oil, and History" (1948). **H. Barksdale Brown** has become general coordinator for the transportation department, in Pittsburgh. **Wessel C. Brodhead**, formerly manager of costs and economic performance in Gulf's New York marine department, has been transferred to Pittsburgh as marine coordinator, succeeding Brown.

JIM SAUL, Davis Oil Co., is the newly elected president of the Denver Landmen's Assn. Other incoming officers include **George Harris**, Shell Oil Co., first vice-president; **Dick Heider**, Petroleum, Inc., second vice-president; **Dave Savage**, Pure Oil Co., secretary; and **E. F. Simpson**, British-American Oil Producing Co., treasurer.

G. E. Merritt

T. W. Whittingham

G. E. MERRITT and **T. W. WHITTINGHAM** have been promoted to district geologists of the newly formed eastern and western districts, respectively, of Shell Oil Co. of Canada's Regina division. Merritt, of the eastern district, will be responsible for all exploration matters in the provinces of Manitoba and Saskatchewan, south of the 51st parallel and east of Regina. Whittingham of the western district, will handle all the area remaining in the two provinces.

G. H. HEMMEN is to be manager of the commercial development division of Union Oil Co. of California's research department, Brea, Calif. Prior to the appointment, he was chief engineer of the department.

G. H. Hemmen

H. W. Howze

HARRY W. HOWZE has been elected a vice-president and manager of aviation sales by Esso Export Corp., New York, international marketing affiliate of Standard Oil Co. (N. J.). Howze, with the Jersey organization since 1930, most recently was president and director of Esso Standard (Near East), Inc.

ONLY SIKORSKY HELICOPTERS ARE FULLY PROVED IN HEAVY-PAYLOAD COMMERCIAL SERVICE

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PUBLIC UTILITIES such as Southern California Edison Co. and Pacific Gas and Electric Co. have used Sikorsky S-58s to airlift steel, concrete and other equipment for construction of power transmission towers and distribution lines in almost inaccessible areas. Above, an S-58 positions a distribution line pole in the Santa Ynez mountains of California.

OIL COMPANIES operating offshore and in remote areas use only Sikorskys for big and demanding jobs. In the New Guinea jungle, for instance, S-58s are transporting crews, sectionalized rigs, machinery and everything needed for construction and operation of well drilling rigs. Here an S-58 carries a mud tank weighing over two tons.

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two

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"the man ahead"

and

"the man behind"

That man just ahead of you hopes you'll take his job away from him. He's plain selfish about it . . . that way you push him up the ladder, too.

The fellow right behind you, what about him? He's another good friend. Just help make him more capable of capturing your present spot . . . see, now he's pushing you!

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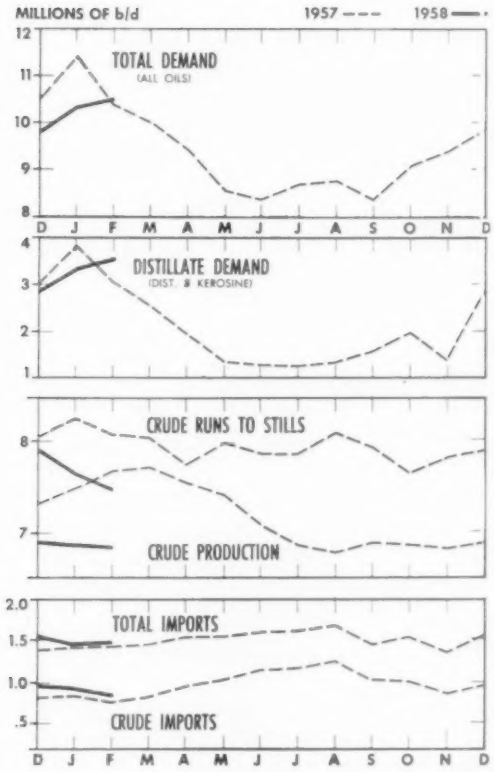
PETROLEUM WEEK'S

Fingertip Figures



TOTAL DEMAND
Latest 4-week average 10.197
Year ago 10.208

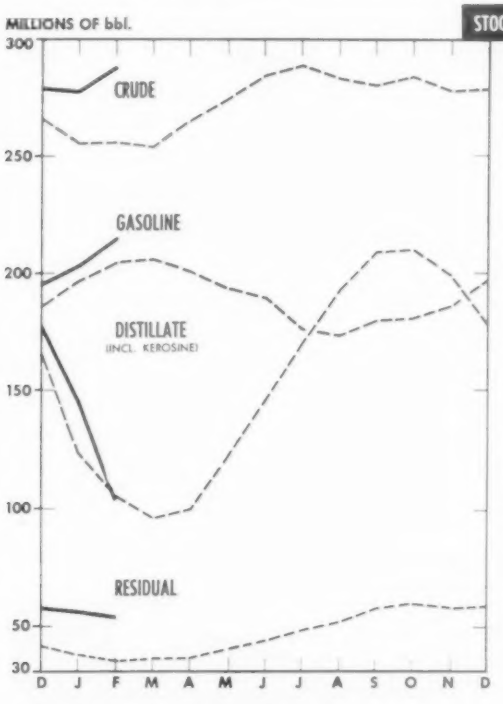
DISTILLATE DEMAND
Latest 4-week average 3.201
Year ago 2.859

RUNS TO STILLS
Latest week 7.479
Previous week 7.488
Year ago 8.098

CRUDE PRODUCTION
Latest week 6.257
Previous week 6.328
Year ago 7.799

TOTAL IMPORTS
Latest week 1.533
Previous week 1.754
Year ago 1.697

CRUDE IMPORTS
Latest week .905
Previous week 1.052
Year ago .907



CRUDE STOCKS
Week ended 3-8 286.1
Previous week 288.0
Year ago 252.0

GASOLINE
Latest week 216.5
Previous week 215.4
Year ago 205.6

DISTILLATES
Latest week 99.3
Previous week 101.6
Year ago 99.3

RESIDUAL
Latest week 55.1
Previous week 54.8
Year ago 36.3

While total inventories of crude and products are nearly 8% higher than a year ago, there are considerable distortions in the over-all stock picture.

For one thing, crude stocks nationwide are up 11%. But at this time last year, they were at an unusually low level due to the large drafts on storage supplies to meet the emergency needs in Europe.

And nationwide, product stocks are now nearly 6% over last year. But a closer look indicates a not-quite-so-bad stock situation.

East of the Rockies, stocks of major products are fairly close to the year-ago levels, but they could still stand some reduction (page 9).

Total U.S. gasoline inventories are equal to a 53-day supply, the same as last year. On the East and Gulf coasts, the present day-supply position of gasoline is two days higher than last year.

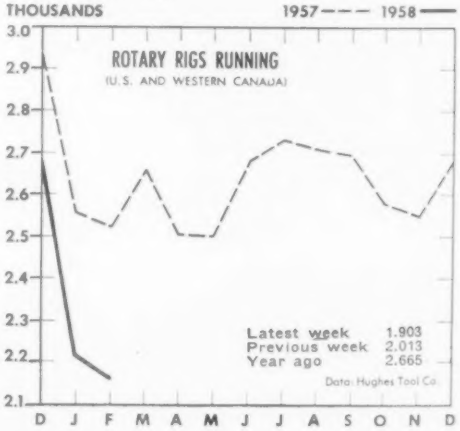
In the Midwest, the day-supply position is the same as last year. But on the West Coast, gasoline stocks are three days over last year.

Distillates stocks across the country are nearly two days below last year on a demand vs. supply basis. The East and Gulf coast stocks are down one day; in the Midwest the supply is nearly ten days below last year.

The worst inventory situations are in middle distillates and residual fuel on the West Coast.

The distillates stocks there are equal to a 75-day supply, up 25 days over a year ago. And residual inventories amount to more than a 90-day supply, up more than 60 supply days.

The high stocks in California push total U. S. resid stocks to nearly twice last year's day-supply position, even though resid stocks are close to last year elsewhere in the country.


THOUSANDS
1957 --- 1958 —
ROTARY RIGS RUNNING
(U.S. AND WESTERN CANADA)
Latest week 1.903
Previous week 2.013
Year ago 2.665
Data: Hughes Tool Co.
D J F M A M J J A S O N D

The Market Trend

'Somewhere the Sun Is Shining Bright'

The downdraft continues on many prices. You see it in the secret price-protection deals on light fuel oils in the East. You see the pressure in the urgent efforts of refiners to find outlets for gasoline. It's there, too, in the distress rates offered for spot barge and tanker voyages.

The stunner last week was the government's bid opening on two cargoes of 89/90-octane gasoline for loading in the Gulf/Caribbean. This is better gasoline than the octane indicates, for it is to have a maximum of 1.5 cc. of lead. The tender drew 13 offerings. Here are the prices, in descending order: 10.37¢, 10.25¢, 10.25¢, 10.05¢, 10¢, 9.94¢, 9.89¢, 9.8749¢, 9.72¢, 9.5¢, 9.15¢, 8.865¢—and, finally 8.73¢, f.o.b. Port Arthur, Tex.

Last week, heating oil prices slipped by amounts up to 0.5¢ a gal. along the East Coast. No sooner had the cuts been posted than new discounting broke out. Truck lots of No. 2 fuel were shaded 0.25¢ at Providence and Boston. Rack prices were all over the lot in New York City, but mostly lower. Further cuts seemed likely.

The slide in No. 2 fuel prices at the Gulf, from 8.5¢ to 8.125¢, didn't stir up many cargo sales. In fact, refiners may have to give fresh concessions to move product. Gulf Coast sellers are bucking what amounts to two ceilings: the 9.25¢ f.o.b. transport price in Chicago, and the 8.8¢ net delivered cargo price at New York. In either direction, the freight factor tends to put pressure on the Gulf.

The atmosphere is not a good one for working out details of 1958-59 supply contracts on heating oils. Many of them are up for renewal on May 1. Already, supplier-customer discussions are acrimonious. The odds right now are that resellers will contract for smaller quantities next year. They'll leave larger quantities open to play the spot market.

All in all, suppliers are in for a touchy spring. Gasoline looks weak right now. The weather's helping on heating oils, but light fuel oil customers are going to be very elusive. Heavy fuel oil prices along the East Coast will probably soften further.

Towing Rates Are Low:

Tow owners on the Mississippi are talking poor these days. Equipment is going begging for March at 0.175¢ to 0.2¢ a ton-mile for Gulf-Chicago hauls. (The break-even point is estimated around 0.16¢.)

Bahia Crude Is Traded:

Brazil gets first marks for the diplomatic coup of the week. Recent trades have accounted for about 20,000 b/d of Bahia crude moving into international commerce.

The trick of it was that Brazil first talked a British company into a trade—and a company that has never sold into Brazil, at that. U.S. oil companies saw their own outlets threatened, suddenly decided to help Brazil off the hook with its unwanted waxy Bahia production.

Third Pumps?

You may be seeing a rash of "third," private-brand pumps springing up at stations handling major brands. It was tried temporarily in an Iowa City (Iowa) price war. Many jobbers thought it was a good idea.

The Market Place AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All prices as of March 17

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U. S. Gulf Coast, cargoes
- Gasoline, 98 oct prem. 12.25-14
- Gasoline, 92 oct reg. 10.5-12.375
- **Kerosine 8.875↓**
- **Heating oil, No. 2 8.125↓-10.25**
- **Gas oil, 48-52 d.i. 8.375↓-10.5**
- **Fuel oil, bunker "C" $2.25-2.35↓**

Caribbean, cargoes
- Avgas, Grade 100/130. 16.5
- Gasoline, 93 oct research prem. 10.75
- Gasoline, 87 oct research reg. 9.875
- Gasoline, 79 oct research. 9.125
- Gasoline, 70-72 oct motor method. 9
- Kerosine 9.125
- **Heating oil, No. 2 8.125↓**
- **Gas oil, 48-52 d.i. 8.375↓**
- Fuel oil, bunker "C" $2.25

New York Harbor, barges
- **Kerosine 9.65↓-9.9↓**
- **Heating oil, No. 2 9.1↓-9.4↓**
- Fuel oil, No. 6 $2.65

Okla-Group 3, northern shpt, bulk
- Gasoline, 89 oct reg. 11.25-12.25
- Kerosine 9.75-10.25
- Heating oil, No. 2 8.5-9.125
- **Fuel oil, No. 6 $1.20↑-1.50↑**

Chicago, bulk
- Gasoline, 91 oct reg. 12-12.8
- Heating oil, No. 2. 9.25-10.65
- Fuel oil, No. 6 high sulfur. 6.65-6.75

Los Angeles, rack
- Gasoline, 88 oct reg. 11.9-13.6
- Diesel fuel, PS 200. 10-11.25
- Light fuel, PS 300. $3.25-3.65
- Heavy fuel, PS 400. $2.70-3.05

Natural Gasoline, Grade 26-70
- FOB Group 3. 4.5
- FOB Breckenridge, Tex. 4

LP-Gas
- Propane, Oklahoma (Group 3). 5

Penna Lubes
- Bright stock, 25 p.t. 26-27
- 200 vis. neutral, 25 p.t. 24-25

Mid-Continent Lubes, Tulsa basis
- Bright stock, solvent, 95 v.i. 24.5-26.5
- Neutral, solvent, 200-210 vis. 20.25-22.25

Gulf Coast Lubes
- Bright stock, solvent, 95 v.i. 24-26.5
- Neutral, solvent, 200 vis. 20.5-23

Eastern Hemisphere

Singapore (Pulau Bukom), cargoes
- Avgas, grade 100/130. 17.5
- Gasoline, 79 oct research. 9.875
- Kerosine 10.125
- Gas oil, 48 d. i. minimum. 10

KEY PRICES—CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, 36.0-36.9. 2.83-3.07
- North Dakota, 36.0-36.9. 3.07
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9. 3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9. 3.07-3.22
  - West Texas, sweet, 36.0-36.9. 3.00-3.07
  - West Texas, N. M., inter., 36.0-36.9. 3.00
  - West Texas, N. M., sour, 32.0-32.9. 2.86
  - East Texas, flat. 3.25
  - Mirando, 28.0-28.9. 3.31
- Illinois Basin, flat. 3.00-3.15
- Pennsylvania Grade, Bradford dist., flat. 4.40
- California, Signal Hill, 21.0-21.9. 2.93†
- North Louisiana-Arkansas, 36.0-36.9. 2.92-3.02
- Wyoming sweet, 36.0-36.9. 3.00
- Wyoming sour, 32.0-32.9. 2.71

Canada (flat prices, at the well)
- Acheson-Stony Plain (Alta.). 2.68
- Leduc-Woodbend (Alta.). 2.74
- Redwater (Alta.). 2.63
- Daly (Man.). 2.46
- Smiley (Sask.). 2.40

Venezuela (Cargoes, FOB lifting port designated)
- Cumarebo, 48.0-48.9, Tucupido. 3.75
- San Joaquin, 41.0-41.9, Puerto la Cruz. 3.34
- Oficina, 35.0-35.9, Puerto la Cruz. 3.05
- Tia Juana, Medium, 26.0-26.9, Amuay. 2.55
- Bachaquero, flat, Amuay, Las Piedras. 2.03-2.23
- Tarra, 38.0-38.9, San Lorenzo. 3.08
- Lagunillas Heavy, flat, Amuay, Cardon. 2.25-2.38

†*Differential per deg. of grav. varies.*

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- Arabia, 34.0-34.9, Ras Tanura. 2.08
- Safaniya, 27.0-27.9, Ras Tanura. 1.79
- Iran, 34.0-34.9, Bandar Mashur. 2.04
- Iran, 34.0-34.9, Abadan. 1.99
- Iraq, 35-0-35.9, Fao. 1.98
- Kuwait, 31.0-31.9, Mina-al-Ahmadi. 1.85
- Qatar, 41.0-41.9, Umm Said. 2.23

Middle East, Eastern Mediterranean
- Arabian, 36.0-36.9, Sidon. 2.49
- Iraq, 36.0-36.9, Tripoli, Banias. 2.49

Far East, Cargoes, FOB Lutong, Sarawak
- Seria Light, 37-38. 2.75

KEY TANKER RATES

(Last paid, per long ton, single voyage)

- U.S. Gulf-New York, clean. (USMC—25%) $2.14
- U.S. Gulf-New York, dirty. (USMC—32½%) $1.92
- **NWI-USNH, dirty. (USMC —60%) $1.08↓**
- NWI-UK/Cont., dirty. (Scale —35%) 21/2*
- Persian Gulf-UK/Cont., dirty. (Scale —50%) 30/2*
- Persian Gulf-USNH, dirty. (USMC —70%) $3.81

**Sterling.*

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Cleveland 15 — J. E. MacArthur, 1164 Illuminating Bldg., 55 Public Square, Superior 1-7000

Denver 2 — J. W. Patten, Mile High Center, 1740 Broadway, Alpine 5-2981

Houston 25 — D. O. Hanson, 724 Prudential Bldg., Jackson 6-1281

Los Angeles 17 — Peter S. Carberry, 1125 W. Sixth St., Madison 6-9351

New York 36 — Edward A. Callahan, Jr., Donald R. Thompson, 500 Fifth Ave., Oxford 5-5959

Philadelphia 3 — W. A. Potter, 6 Penn Center Plaza, Rittenhouse 6-0670

San Francisco 4 — William C. Woolston, 68 Post Street, Douglas 2-4600

Tulsa 19 — J. A. Hartley, 909 Enterprise Bldg., 522 South Boston, Gibson 7-5594

England, London E. C. 4 — Herbert Lagler, McGraw-Hill Co., Ltd., 95 Farrington St.

DEPT/Service & Equipment Companies

T. E. Morton

W. J. Greer

TOM E. MORTON has been named executive vice-president of Welex, Inc., Ft. Worth, and **WALTON J. GREER** has been appointed vice-president in charge of all Welex engineering and research with offices in Houston. Since October, 1957, when Welex Jet Services, Inc., and the electrical well services department of Halliburton Oil Well Cementing Co. were consolidated, Morton has been vice-president in charge of operations, and Greer has been director of research and engineering.

J. B. FLEMING is the new vice-president and division manager of the recently organized Louisiana Gulf Coast division of Welex, Inc., in New Orleans. The new division covers the districts of Harvey, Houma, Lafayette, and Lake Charles, La., and Laurel, Miss.

ED L. DRESSEL will head the new field service laboratory at Odessa, Tex., for Tretolite Co. division of Petrolite Corp. He will also correlate liaison between field and central laboratory in the development and research program of the company, succeeding **James H. Burrell, Jr.** Burrell has moved to Midland, Tex., as assistant to the manager of the West Central division of Tretolite. Prior to the new appointment, Dressel was working in the company's St. Louis (Mo.) development laboratory.

E. L. Dressel

F. F. Florence

FRED F. FLORENCE has been elected board chairman of Lone Star Steel Co., Dallas. Florence, chairman of the executive committee and chief executive officer of the Republic National Bank of Dallas, succeeds **C. E. Owen**, who has resigned.

R. B. HILL has been named wellhead sales supervisor for National Supply Co., and will head a new wellhead equipment sales unit in Dallas. **Earl Hensley, Jr.**, will be wellhead sales representative at Houston, **Bill Mitchell** at New Orleans, and **H. H. Vaughn, Jr.** at Odessa, as members of the new unit. Hill, with the company since 1941, has most recently been a sales engineer in Houston.

LUCEY EXPORT CORP., New York, has been named export sales representative for Tube-Kote, Inc., Houston, in Brazil and Argentina.

ROBERT E. MURPHY is president of Equipo Petrolero Compania Anonima (EPECA), newly organized Venezuelan company engaged in the sales and service of Harold Brown Co. gas-lift equipment. Other officers include **Ed T. Malloy**, executive vice-president and **Lamar W. Davis, Jr.**, vice-president in charge of engineering. Murphy and Malloy are also associated with Levingston Shipbuilding Co., Orange, Tex.; Davis is a consulting petroleum engineer from Houston.

R. K. EPPS, JR., has been appointed sales development engineer in the general offices of the Baroid Division, National Lead Co., Houston. **K. D. Tanner** will succeed Epps as area engineer in Baroid's Houston office. **W. M. Carnicom** has become area engineer, Louisiana Gulf Coast, replacing Tanner.

R. K. Epps Jr.

W. D. Schelbe

W. D. SCHELBE is the new director of purchases for Wolverine Tube, a division of Calumet & Hecla, Inc., Allen Park, Mich. Schelbe, formerly assistant director of purchases, will be responsible for coordinating the purchasing activities of Wolverine's plants in Detroit and Decatur, Ala., and the London (Ontario) mill of its Canadian subsidiary.

O. W. WADE will head World Supply Co., newly organized Houston firm specializing in engineering services related to corrosion control in the petroleum and pipeline industries. Wade was formerly chief corrosion engineer for Transcontinental Gas Pipe Line Corp.

JAMES T. BROCKMAN has joined Elgen Corp., in Abilene, Tex. Brockman, a mechanical engineer, has been actively engaged in electrical logging, perforating, and auxiliary services.

DALE D. KOEPKE has been named project engineer for the process instruments division of Beckman Instruments, Inc., Fullerton, Calif. He joined Beckman in October, 1957, following over four years with Union Oil Co. as an instrument engineer at

the Wilmington (Calif.) refinery. Two other appointments in the division are **Wayne M. Crum** and **Richard Villalobos** as associate application engineers. Crum was formerly a chemical engineer for National Aniline division of Allied Chemical & Dye Corp.; Villalobos a chemist and technologist with Shell Oil Co., in Wilmington.

J. P. Lord W. H. Rowell

WILLIAM H. ROWELL and **JOHN P. LORD** have been named product managers for bolted couplings and welding fittings, respectively, by Dresser Manufacturing Division, one of the Dresser Industries, Bradford, Pa. Rowell formerly was vice-president in charge of sales for Finco, Inc., Aurora, Ill., and Lord was previously with Muncie Malleable Foundry Co. and Westinghouse Electric Corp., in Muncie, Ind.

DR. A. H. ROEBUCK and **DR. HORACE CRAWFORD** have joined the research and development staff of The Western Co. Roebuck will serve as assistant to the manager of the research and development department, in Midland, Tex. Crawford is a research associate at the firm's Dallas research laboratory. Roebuck was formerly research associate for the Argonne National Laboratories, Chicago, and research group supervisor with Continental Oil Co., Ponca City, Okla. Crawford was a gas engineer with Sun Oil Co.

GEORGE O'LEARY, president of Houston Oil Field Material Co., is also president of the newly formed Venezuela subsidiary, HOMCO International C. A., in Maracaibo. Other officers of the new subsidiary are **D. B. Allison**, vice-president and general manager; and **J. E. Peters**, secretary-treasurer. **A. F. Coleman**, operations manager, is stationed in Maracaibo.

RALPH E. EVANS and **HARRY CUTHBERT** have joined Hercules Motors Corp., Canton, Ohio, as assistant manager of distributor sales and assistant chief engineer respectively, for the new line of air-cooled engines. Prior to the appointments, Evans was general sales and service manager for industrial engines, Cuthbert chief engineer of Avco Mfg. Co.'s Lycoming division.

WILBUR S. ROBERTS, JR., is the new manager of Stone & Webster Engineering Corp.'s new business division, New York. He will coordinate the new business activities of the New York and Boston engineering and construction company's offices in Chicago, Houston, Los Angeles, San Francisco, and Seattle. Prior to the promotion, Roberts was administrative assistant, in Boston.

LEO J. TROUTZ has been named vice-president of Cummins Sales & Service de Venezuela C. A. He will continue as general service manager of Cummins Sales & Service, Inc., Ft. Worth, and will divide his time between the two organizations. Troutz has been with Cummins since 1943.

WILLIAM (Irish) DELANEY will head the newly opened Farmington (N. M.) district office of Oil Center Tool Co., manufacturer of high-pressure wellhead equipment. Delaney, formerly city sales manager in Corpus Christi, will be assisted in Farmington by **Dave Cooper**, a recent employee.

TAYLOR MILTON, executive vice-president, moves up to the presidency of Garrett Oil Tools, a division of U. S. Industries, Inc., at Longview, Tex. **H. U. Garrett**, founder of the division, has become a vice-president of the parent company.

J. FRANK HENDERSON has joined Kaiser Engineers, a division of Henry J. Kaiser Co., as a development engineer in the minerals division, Oakland, Calif. Prior to this position, he was superintendent of a large potash plant in the Southwest.

ROBERT MUDDIMAN CO. has been named distributor of an additional line of W-K-M products in Canada. The company, with offices in Toronto and Montreal, will serve eastern Canada with a complete line of valves and fittings.

JOHN NORWOOD will manage the Oklahoma City district office for Hycalog Co. He formerly held a similar post at Billings, Mont. Operations in North Dakota and Montana will be handled from the Casper (Wyo.) district office in the future.

WESLEY BOURDO will manage the new Tripoli (Libya) office of K. L. Bourdo Co., oil field supply sales and service organization which handles Ideco sales and service in the Middle and Near East and Northwest Africa. Bourdo was formerly with Santa Fe Drilling Co., in California and Trinidad.

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AS THE EDITORS SEE IT

The search for oil . . .

Scientists Improve the Odds

THE RATHER DISAPPOINTING exploratory drilling activity in the U.S. that was reported by the American Assn. of Petroleum Geologists last week (PW—Mar.14'58,p11) has one bright aspect. And that is the unquestionable value of using all available technical information in locating wildcat tests.

Data developed by the association's Committee on Statistics of Exploratory Drilling show that the new field wildcats located on technical recommendations were 2.36 times as successful as those drilled without such advice. Of the 6,576 new field tests whose locations were based on technical advice, 735, or 11.2%, were successful producers. And of the known 550 tests located without the benefit of technical recommendations, only 26, or 4.7%, were classed as successful.

The over-all success ratio of all of the 8,014 new field tests drilled in the U.S. and Alaska last year was 10.9%.

IT IS ENCOURAGING to note the increasing tendency among producers to base their tests on scientific information. Last year 82% of the strict wildcats drilled were based on technical data. Back in 1944, only 77% of the strict wildcats were located on the basis of expert advice.

But despite the greater use of technical advice, the oil finding rate in the U.S. last year was at a postwar low of only 10.7 bbl. of oil found per foot of strict wildcats drilled. That is no slap at geologists, geophysicists, seismologists, geochemists, and the specialized exploration scientists.

It is quite obvious that oil is becoming harder to find. Too, it is rapidly becoming costlier to find. And this means simply that producers must take advantage of all of the technical advice available in locating expensive wildcats.

ONE GEOLOGIST recently told PETROLEUM WEEK: "We geologists can locate the structures from our surface observations alone. We don't actually need the geophysicist's help. On the other hand, the geophysicist can locate them without our help, too, simply by using his seismic equipment, and without surface observations.

"But we now feel it takes both of us, working together, to find those strat traps,"—the most difficult to find, and probably the most promising, area of future oil reserves.

Last year strict wildcat tests based on geology alone were 9.2% successful. Those based on geophysics alone (including a few holes based on geochemistry) were 18.7% successful. And the combination of geology and geophysics resulted in a highly favorable success ratio of 15.4%.

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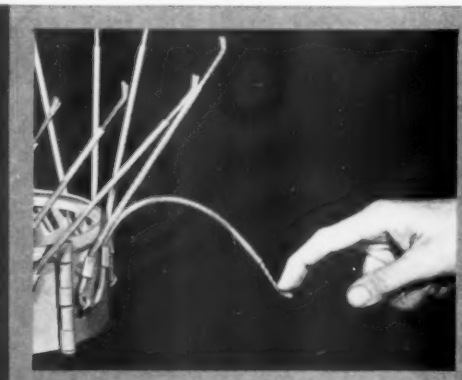

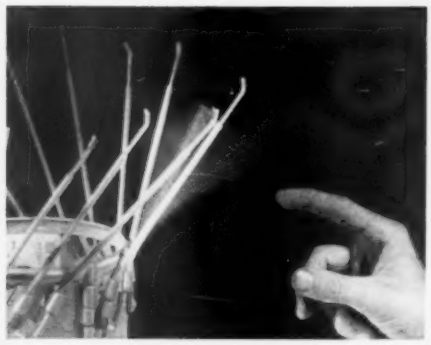

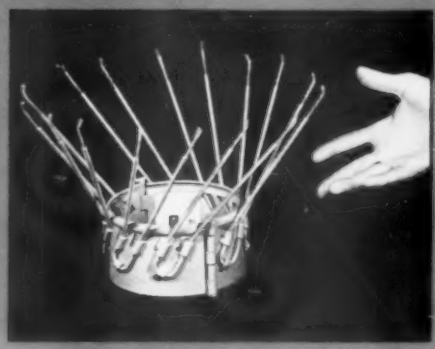

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Byron Jackson Scratchers are manufactured in sizes to fit all API casing OD's from 4½" to 13⅜". Every model features a sturdy hinged clamp-around design.

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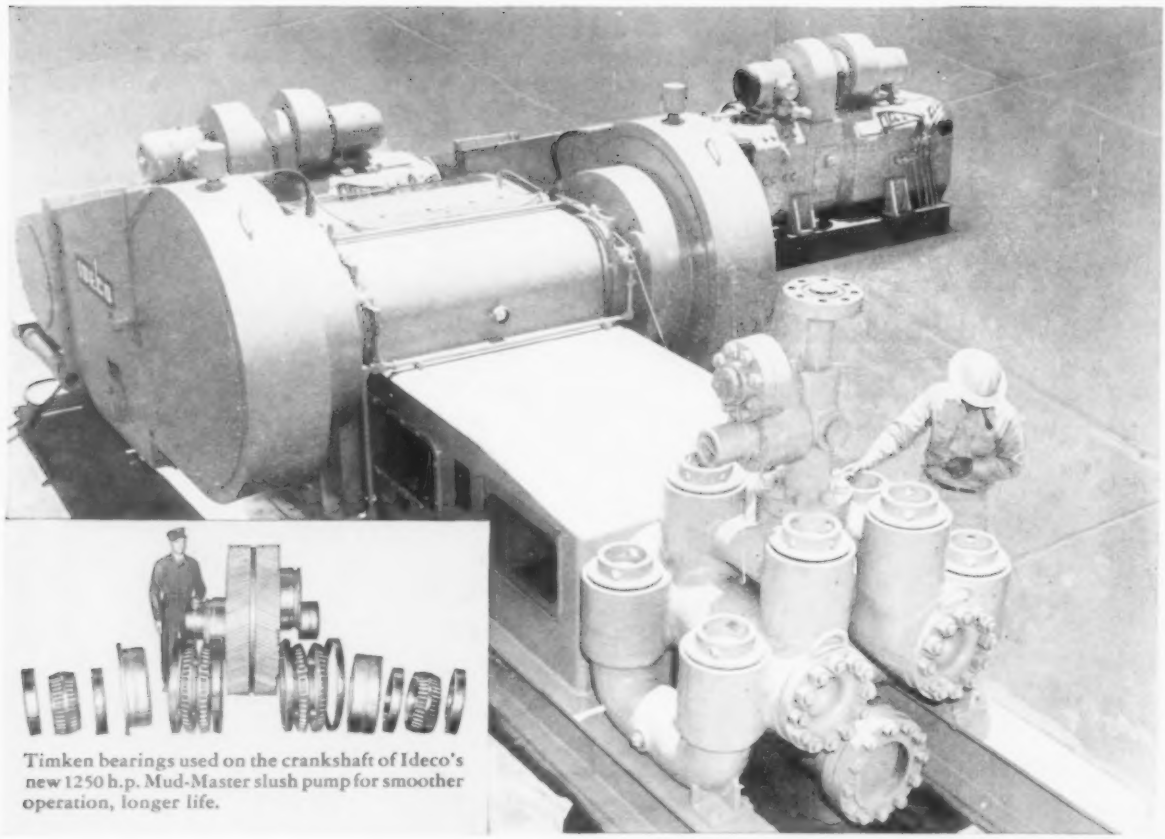

Timken bearings used on the crankshaft of Ideco's new 1250 h.p. Mud-Master slush pump for smoother operation, longer life.

New pump meets any mud circulation problem with TIMKEN® bearings for longer life and minimum maintenance

THIS new 1250 h.p. Mud-Master slush pump built by Ideco meets the increasingly heavy hydraulic requirements of deep oil well drilling. Because it's designed for sustained trouble-free operation under highest pressure conditions, Ideco engineers equipped its entire crankshaft assembly with Timken® tapered roller bearings.

Makers and users of rugged oil-well equipment specify Timken bearings because they provide long life with minimum maintenance. Because of their tapered construction, Timken bearings take both *radial and thrust loads*, or any combination. And full line contact between rollers and races gives them load-carrying capacity to spare. They hold the crankshaft in rigid alignment, minimize deflection and end-play that wear down related parts. And Timken bearings take shock loads, too. They're case-carburized for hard, wear-resistant surfaces over tough, shock-resistant cores.

To get all these advantages for the machinery you buy or build, specify Timken tapered roller bearings. Always look for the trademark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

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